

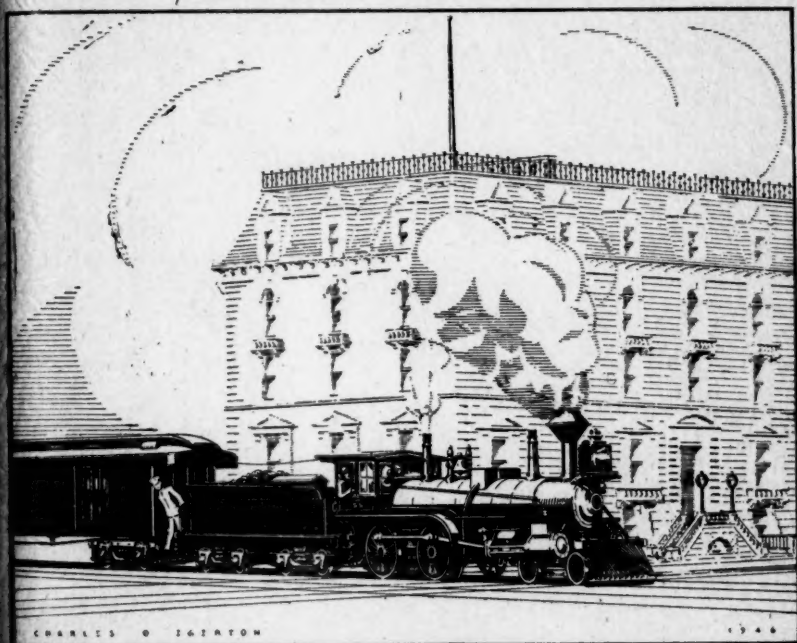
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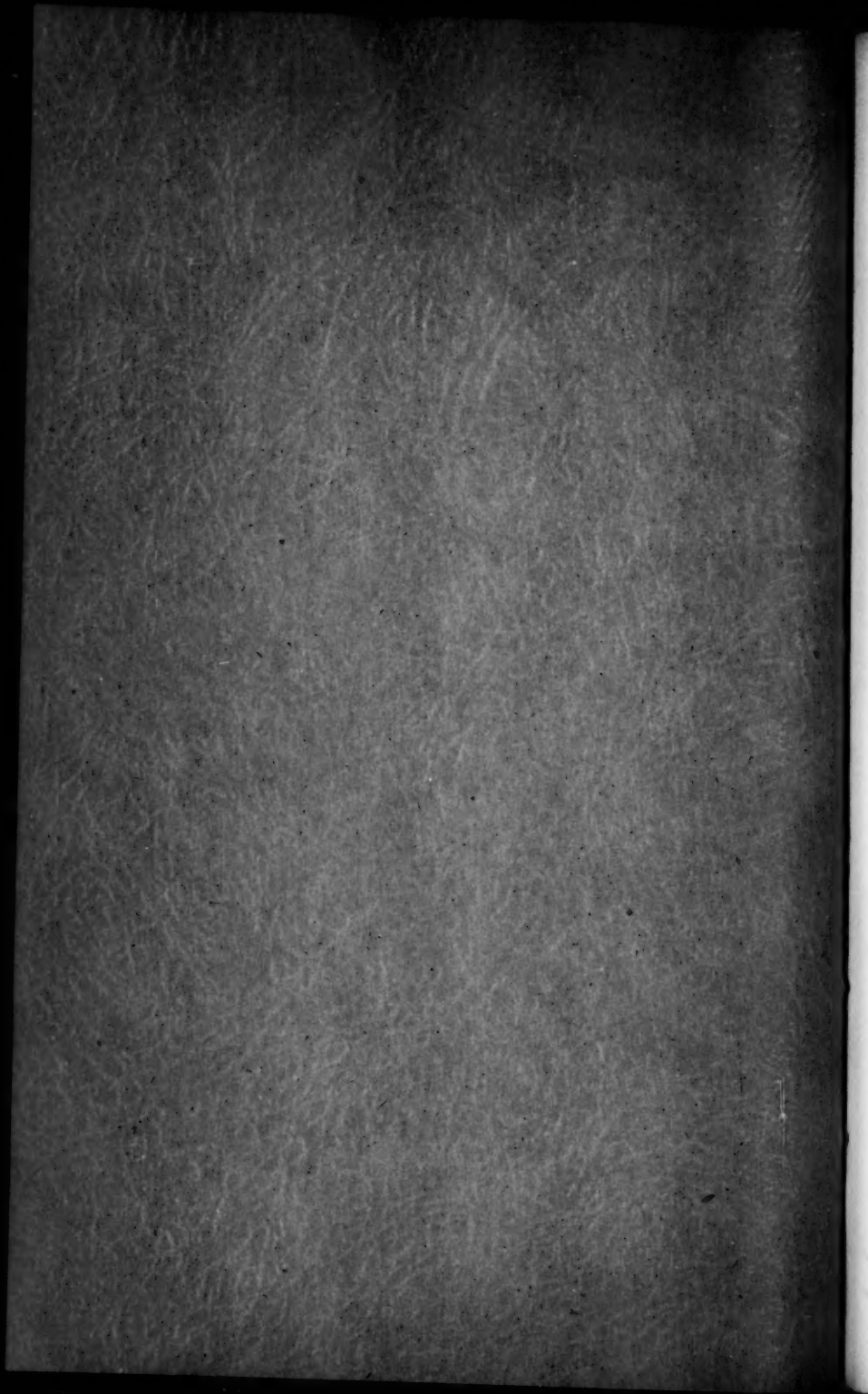
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THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY

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In preparing our first publication for the year, we have tried to give our members as interesting a variety of contributions as possible. First, we are continuing the Newton papers with another contribution on the Aurora Branch R. R., one of the pioneer railroads that make up the present Burlington System. The paper prepared by Leslie E. Freeman, Jr., represents a careful study of the New Jersey R. R. & Transportation Co., a vital link in the New York-Philadelphia service and which we hope will be of interest to our membership.

Robert R. Brown has prepared a contribution on our track gauges. Not until one investigates the subject is he prepared for the many widths and the origin of our present standard gauge has never been too clear in the minds of many of us—it has been taken for granted.

We welcome Miss Laura E. Armitage with her interesting account of the Richmond & Allegheny R. R., now a part of the Chesapeake & Ohio and Davis S. Weatherwax has added another chapter to his Adirondack Ry. sketch that appeared in our Bulletin No. 74. Under the guidance of Stewart Graham, a paper has been prepared correcting the majority of the errors in the rosters in our Bulletin 86. Mr. Pettengill, the author of this bulletin, still deserves our commendation for a fine piece of research but the preparation and the checking of these rosters is no easy task and one that will not improve with the coming years for the steam locomotive.

Lastly, we commend the industry and research of Fred Jukes with his drawings and his descriptions of the various valve motions. Properly, this material should all appear between two covers but, the value of this material lies in the illustrations, not so much in a long detailed description. Because of the expense involved, it was decided to group these valve gears in the four headings selected by Mr. Graham and we hope our members, many of whom are not perhaps technically inclined, will

appreciate the time and work involved in preparing this material for there is no question as to its historical interest and value.

October 11th, 1853

On this day, nearly one hundred years ago, a locomotive was either pulled or slowly pried along the track, through the gate, across Wales Street, to the tracks of either the Taunton Branch or New Bedford & Taunton Railroads. The locomotive was the "James Guthrie," built for the Jeffersonville & Indiana R. R., now part of the Pennsylvania System, and it was the first locomotive built by that famous builder—William Mason of Taunton, Mass. Over seven hundred locomotives followed the "James Guthrie" all destined to play their roles on railroads in all parts of this country, all built under the guidance of that genius. With his passing, the locomotive building gave way to other interests and Old Colony No. 231, a bogie, construction No. 754 was the last one to cross Wales Street on one day in March of 1890.

What William Mason did for the American locomotive you will find in the mechanical journals of the period as well as in our Bulletin No. 15 but it can be truthfully stated that he was the man to introduce in his engines the beautiful proportions that made them neat and trim looking that were soon copied by the other builders and gave to the railroads of this country the handsome locomotives of the nineteenth century that so many of us well remember and which we find in our collection of photographs.

The inclusion of a colored frontis-piece will come as a surprise to our membership. It is the result of a new process developed by one of the many companies engaged in this work and is a gift to this Society. The reprint is made from a colored 2x2" slide and, most people seem to agree that it is very well done.

We are not only indebted to this company for their kindness, they have asked that their name be withheld but we are also indebted to Mr. Paul W. Nesbit, 711 Columbia Road, Colorado Springs, Colorado for the use of the original kodachrome. If any of our members are interested in these kodachromes, they might get in touch with Mr. Nesbit, who handles only color slides.

The original was taken on June 21, 1950 at Silverton, Colo. The station and a bit of the town may be seen beyond the train and the train runs on a tri-weekly schedule between Silverton and Durango, a distance of forty-one miles. The road, of course, is the Denver & Rio Grande Western. We appreciate the kindness of all who have helped make this colored reproduction possible.

The Society has some extra copies of this colored reproduction and, in order to help out the Room Committee, they have been turned over to Mr. John W. Merrill, Curator, 196 Pleasant St., Newton Centre (59), Mass. Postage and packing are the chief items of expense and copies may be obtained at 25c each, five for one dollar.

101 Valve Motions

BY FRED JUKES

FOREWORD

Beginning with this issue of the Bulletin, we are presenting a series of articles on what is probably the most important mechanism of the steam locomotive, the Valve Gear, a non-technical history prepared by Mr. Fred Jukes, of Blaine, Washington, and what is the most comprehensive study of the design and operation of locomotive valve gears that it has been our pleasure to encounter.

Because of this comprehensive scope of Mr. Juke's article and the number of illustrations involved, and because the varied interests of our members demand a diversity of subjects in each bulletin, it has seemed best to publish this history in four installments. The gears themselves can be resolved into seven general groups, as follows:—

1. Early Valve Gears.
2. Hook or Gab Motions.
3. Link Motions.
4. Gears of the Hackworth Principle.
5. Gears of the Walschaert Principle.
6. The Stevart Gears.
7. The Miscellaneous Valve Gears.

The first three groups will be treated in this installment, the Hackworth group in the next, the Walschaert and Stevart Gears in the third, and the Miscellaneous Gears in the last installment.

The drawing of each gear is numbered, and the drawing number of each gear is shown in the title of the text describing the respective gears. Since it was necessary to re-group some of the gears after the drawings were originally numbered, the drawings will not in all cases occur in strictly numerical order.

However, this will in no way affect the continuity of the article, as the number of each drawing is referred to in the description in the text.

In all the drawings, fixed centers are shown in solid black. Where they are apparently located upon some moving part, such as, for instance, the arm of a rocker, it must be presumed that they lie in a different vertical plane.

The gears of Group I include Single Eccentric, Hawthorne, Carmichael (Roller), Carmichael (Type 2), and Crampton. Drawings 1 to 5 inclusive.

Gears of Group II include, Cabry, V-Hook (Stephenson, prior to 1838), Buddicom, Drop Hook, V-Hook (Stephenson, 1841), and the Double V-Hook (Rogers). Drawings 6 to 11, inclusive.

Group III gears include the Stephenson Link, Stephenson (early Rogers type, Uhry & Luttgens, Anderson, Stephenson (French adaptation), Gooch, Durant-Lencauchez, Allan (straight link), and Englemann. Drawings 12 to 20-2.

MOTIVES and APOLOGIES

The idea of attempting to list most of the various reversing valve-motions that have appeared during the development of the reciprocating steam engine did not come to the writer all at once.

Many admirers of the locomotive have passed up an interesting subject by side-stepping a little study of valve-gears; and while the author's search into the intricacies of our old familiar "link" motion, and of the later popular Walschaerts variety, started many years ago, it was the photo of an 0-8-0 Baldwin on a Peruvian two-foot gauge road that caused him to set out on the wider quest.

Since 1934, after running down the workings of this little engine's valve-motion, diagrams have been made of each new gear when found, and information regarding it, if, and when, available, filed.

The resulting list of motions does not, of course, represent all that had been done in this field, but another ten years work might fail to round them all up, for many must have disappeared entirely.

The compiling of this list has been a fascinating task and has brought, as one of its rewards, at least a rough understanding of the requirements to be filled and the pitfalls to be avoided in the selection of one of the most important functioning parts of the locomotive, its valve-motion.

The author begs leniency in judgment on what may prove to be errors. In gathering information from odd sources it would be expecting almost too much for mistakes not to appear somewhere along the line. In the interest of accuracy, any corrections will be gladly welcomed, and the editor may be prevailed upon to publish them in a later number of the Bulletin.

There is little question but that the reciprocating steam locomotive is soon to retire from the field of transportation. Even the internal combustion engine may in time give way to a more efficient power, but it is doubtful if any future motive power will be surrounded with the halo of glamour, or come so near to being a living, breathing machine as the steam locomotive. We who have seen and lived with it have been privileged.

A BIT OF HISTORY

While this is an attempt to catalogue a variety of locomotive and other reversing valve-gears, and to roughly discuss their merits and shortcomings, it may not be amiss to include a little history of the different motions that have, from time to time made their bow on the stage of locomotive engineering.

Many of these got little further than the drawing board, some were tried and found wanting, more enjoyed popularity for a day, while very few survived to gain wide application and render really satisfactory service.

Several of the motions herein described have been developed by different inventors, each totally unaware that his own particular idea

was unfolding in the mind of another; a fascinating story if we knew all of it.

We will pass over the slide-valve except to say that it has been credited in its essential form to William Murdock (1754-1839), an engineer in the employ of Boulton & Watt, in 1799; and that, with various refinements such as lap, auxiliary ports and balancing, it remained for over eighty years, after its application to the locomotive in 1820, as *the* distributor of steam to the cylinder. The piston-valve performed the same duties in much the same way, but though introduced as early as 1832, it was never extensively used on locomotives until after 1900, due mostly to lubrication and structural difficulties. The only other types of valve worthy of note are the Corliss, sleeve, and poppet, none of which have yet found wide acceptance in locomotive work. There is also the Uniflow method of steam admission and exhaust.

All arrangements for regulating the movement of the valve may be termed valve-gears or valve-motions. It is with these so-called "motions" rather than with the valve itself that we are concerned.

In the locomotive they began with the application of eccentrics, a single one of which was used for each valve. These had to be loosened and re-set on the axle each time the engineer decided to reverse the engine.

For the next twenty years inventive genius labored with the cam and frame, loose eccentrics working between stops on the axle, wedge motions, adjustable eccentrics, spiral sleeve, and drop- and V-hook motions in an endless procession. The hook motion gradually evolved into the Stephenson gear about 1842, though an identical link motion had been worked out and, through an unfortunate circumstance, all but forgotten, during the early 1830's.

Not long after Stephenson first applied the link motion to his engines in 1842, Egide Walschaerts patented *his* first gear. It was applied to a little engine on the Belgian State Railways in 1848, and quickly won its place as the foremost valve motion in Continental Europe: but it found little favor in either England or America till another forty years had rolled by.

By the middle of the 19th Century the American motive power man, who had been fussing around with the various and sundry older types, and creating a number of new ones of his own, took the Stephenson gear to his bosom, to the practical exclusion of all others. Its introduction was due mostly to the persistence of Thomas Rogers, the foremost locomotive builder of Paterson. He started using the Gooch link in 1849, but quickly switched over to the Stephenson.

Another famous American builder, William Mason, of Taunton, Mass., made strenuous efforts in the seventies and eighties of the last century to introduce the Walschaerts gear, but the powers that were would have none of it. Mason, however, did apply the motion to a large number of his "Mason-Fairlie" locomotives, with the result that they showed remarkably efficient performance. Old-timers who ran them almost universally attested to this. By 1904, when American

power had become so heavy that there was lack of room between the frames for the Stephenson gear, motion simply had to move outside; and today one rarely sees a modern American locomotive fitted with the conventional link motion.

After the development of the Stephenson link, came a movement toward its improvement and simplification. This took place almost immediately, and resulted in two rather widely used variations. Gooch, another British engineer, brought out his constant lead link motion, in which the link was curved in the opposite direction to the prevailing type; and Alexander Allan, whom we should not confuse with the Allen of double-ported valve fame, put his "straight" link on the market. Both were more or less popular in Europe, the Allan particularly for lighter work. Both were also used in America.

These three gears, Stephenson, Gooch, and Allan, have been generally termed "Link Motions," and they have much in common. Scientifically speaking, all valve motions are built up of a series of links, though differing much from each other in the way in which they transmit movement from the eccentric, return crank, cross-head, or main rod, to the valve-stem. As opposed to the so-called "link motions" we may loosely term most of the rest "Radial Motions," even though they may incorporate a slotted link, either stationary or moveable, in their design.

Some years after the well merited, and almost universal, adoption of the Stephenson and Walschaerts gears, came the person of John Wesley Hackworth (1820-1891) who, though he reaped little or no financial benefit from his efforts in developing valve motions, exerted a profound influence on later design. His patents were taken out from 1859 to 1876, but, in spite of all the attempts he made to introduce his gears, they never found favor with locomotive men. They did meet with success in marine and stationary practice to a considerable degree.

Several well-known gears, both in America and Europe, are based directly on the original Hackworth principle, though parading as new inventions. These will be taken up later.

Disregarding the earlier, or searching, efforts in the development of an efficient motion, we now have three distinct types; the "Link Motions" consisting of two eccentrics with their rods coupled to the ends of a straight or curved link; the "Walschaerts," whose motion is a combination derived from a single eccentric or return crank, and a cross-head connection; and "Hackworth" wherein one eccentric or return crank imparts its motion through a rod, from a point on which a second rod moves the valve stem. Reversal is carried out in several different ways.

Nearly all gears are designed on the principles laid down by these three main types. There are, however, a few exceptions to be noted. Some valve motions which have found adoption to a greater or lesser extent have been the result of a combination of the features found in two or more of the systems mentioned: on the other hand there are several that can hardly be classified as a development of any of the types referred to.

Here are some of the instances in which fellow inventors arrived at approximately identical results: William T. James invented the modern link motion in 1832, a decade before Williams and Howe, of the Stephenson Works, arrived at the solution of the problem; Walschaerts, the Belgian, and Heusinger von Weldegg, a German engineer, worked out an almost identical gear, with Walschaerts in the lead: in 1878 and 1879, Joy, an English engineer, and Chas. Brown, of the Swiss Locomotive Works, independently worked out the so-called "Joy" gear (a development of Hackworth's) with only a minor detail to differentiate between them; Stewart, of the famous English locomotive building firm of Sharp, Stewart & Co., and Pius Fink, of Germany, each in the same year (1857), invented a one eccentric link motion, their purpose being to simplify the existing gear with its double set of eccentrics, straps and rods: lastly, Hackworth's work was done without his knowledge that a similar valve motion had been invented in France, ten or twelve years earlier, by Marquis de Solms, though apparently no practical application was ever made of the French design.

Many students of valve motion find it difficult to understand the reasons for the adoption of such comparatively crude systems as we have today for the distribution of steam in locomotive cylinders, when there are available such mechanisms as Corliss, poppet, and oil pressure valves, and others which have been designed to give quick admission, an abrupt cut-off, and controllable compression and release; in other words a theoretically perfect steam cycle.

A number of these have been tried and found to yield almost unbelievable savings in water and coal consumption, yet, when subjected to the real test of everyday service, they were soon quietly laid to rest. The balance sheet is the final arbiter. It may be that first costs did not warrant the change; that a too great complication made for breakdowns and expensive repair jobs; or simply to conservatism on the part of officials or engine men. Possibly to all of these.

At all events, after the final adoption of the Stephenson link motion, it was "refined," "improved," and "superseded" in dozens of ways; but it stayed, the most satisfactory and fool-proof gear, and gained the distinction of having been fitted to more locomotives than all others combined. It did this in spite of its theoretical defects, some of which actually contributed to its practical working advantage.

Today Walschaerts and Baker gears, though theoretically little in advance of the old link motion, but structurally a vast improvement on it, are doing the job in such a manner that there seems to be little likelihood of their being supplanted, at least for some time to come, in their function of delivering steam to the modern locomotive cylinder.

PISTON VALVES

To the average locomotive man the piston valve is a comparatively recent invention, for it wasn't until about 1900 that it began to make itself felt as a serious competitor of the slide valve. Yet, as far back as 1832, Richard Roberts, of the English locomotive building firm of

Sharp, Roberts & Co., patented a piston valve and, during the following year, incorporated it in locomotives for the Liverpool & Manchester and the Dublin & Kingstown Railways. The valves in these engines were of wrought iron and the valve chambers of cast iron, so that unequal expansion when heated caused them to give trouble. This resulted in the long time abandonment of this form of valve as a steam distributor.

The writer has photos of a couple of old Milwaukee & St. Paul engines fitted with piston valves, the "Fred P. Merrill," built by Norris Bros. in 1848, and the "L. B. Rock," built in 1854. These engines were both rebuilt in 1869, by Master Mechanic L. B. Rock, and were photographed at that time. The writer doesn't know whether the piston valves were part of the original design, or applied in rebuilding.

Though expansive working was hardly necessary in the days when working pressures rarely exceeded 50 lbs. per sq. in., Roberts was aware of its value.

In 1828, M. Hallette, of Arras, France, employed a variable expansion gear in the engines of some light draught steam-boats built by him for navigating the Garonne River.*

Why the older types of valve-motion are still with us

While, compared with stationary or even marine practice, the locomotive can hardly be said to excel in thermal or mechanical efficiency, it is really a very satisfactory machine insofar as all-round effectiveness is concerned.

It must be remembered that the locomotive works under more difficult conditions than any other form of steam engine. In addition to having to carry its own steam producing plant, its moving parts, such as main rods and valve motion, are connected at one extremity to unsprung wheels and axles, while the other moves in guides and bearings secured to frames that move vertically at every uneven place in the track.

This more or less constant vertical movement causes a distortion in the correct occurrence of valve events, some valve-gears suffering more than others as a result of it.

Balancing reciprocating parts for differences within the speed range of a locomotive is very difficult, little protection can be afforded from the weather, and grit and dust enter the wearing surfaces. A curving track necessitates allowing for end play in the journals and rod pins; braking, and wear and tear incident to starting and pulling at full power are heavier than with other types of steam engines.

These very real and onerous operating conditions furnish part of the answer as to why the more delicate and theoretically more perfect valve gears have so often signally failed to live up to expectations over any extended period when thrown into this severe testing ground.

*Note. Mention of the above, though these particular inventions did not materially affect the progress of locomotive valve gear, is made merely to fix a few historical mile-posts.

The steam locomotive has played a unique role in the economy of man. It has fought its way into the field of land transport, in this field it has reigned supreme, and from this field it will disappear. Its part in man's migrations has mightily influenced history. No machine has been more surrounded by glamor, none has so stirred the heart of boyhood or commanded the admiration of young and old alike as the steam locomotive. Its glory has departed, but it will go out slowly, and those of us who have known it, and lived in its palmyest days, will deeply regret the passing of the most alive and fascinating machine man has devised.

SINGLE ECCENTRIC

(Dwg 1)

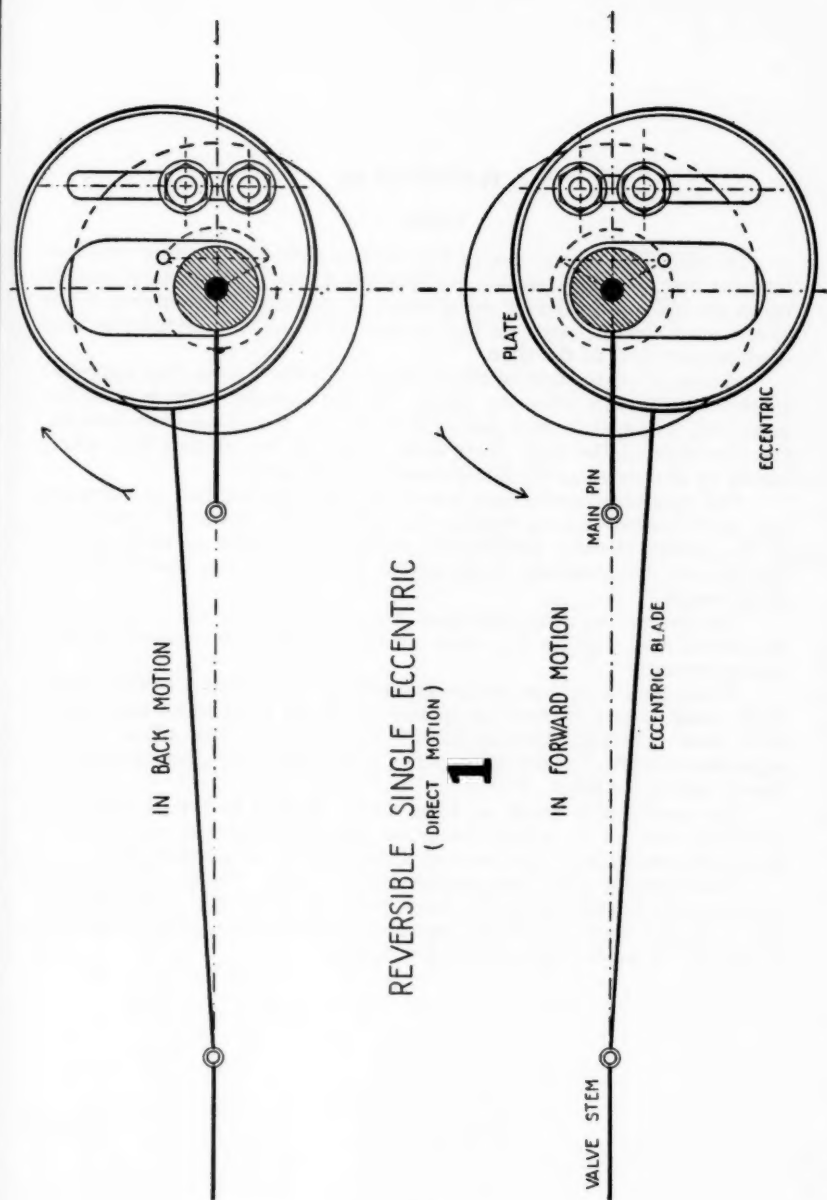
This primitive motion certainly had the virtue of simplicity, if it did lack the convenience and efficiency of later mechanisms. The diagram shows a circular plate keyed, or otherwise fastened, to the driving axle, and carrying two studs on the side opposite the main pin. This where direct motion is used. For indirect motion (where a rocker is interposed between the eccentric blade and valve stem) the studs are placed on the side of the plate between the main pin and the axle.

The eccentric, which in this case would have to be slipped over the axle, is made with two slots, the larger of which fitted loosely on the axle, and the smaller one over the two studs. The slots are of a length sufficient to allow moving the eccentric across the face-plate, to stop at the latest allowed cut-off for either forward or backward running.

A predetermined amount of angular advance is provided.

If these eccentrics were securely bolted, this gear proved good enough for the needs of its day. It is needless to say why, where there was much switching to be done, horses were assigned to the task.

This was in all probability the first reversible locomotive gear in which an eccentric was used. Its day was short.



HAWTHORNE

(Dwg 2)

In 1838, Hawthorne, one of the earliest British locomotive builders, brought out the valve motion bearing his name. This rather complicated motion was evidently an attempt to get rid of eccentrics, which took a good deal of room on the cranked axles of the inside-cylindere engines prevalent at the time.

It was one of the first of the so called "Radial" gears that appeared in such numbers in following years. In this case the drive is from the main rod, in which a stud and link block are placed midway between the two ends of the rod. This block slides in the slotted link which moves up and down as the block traces its oval path.

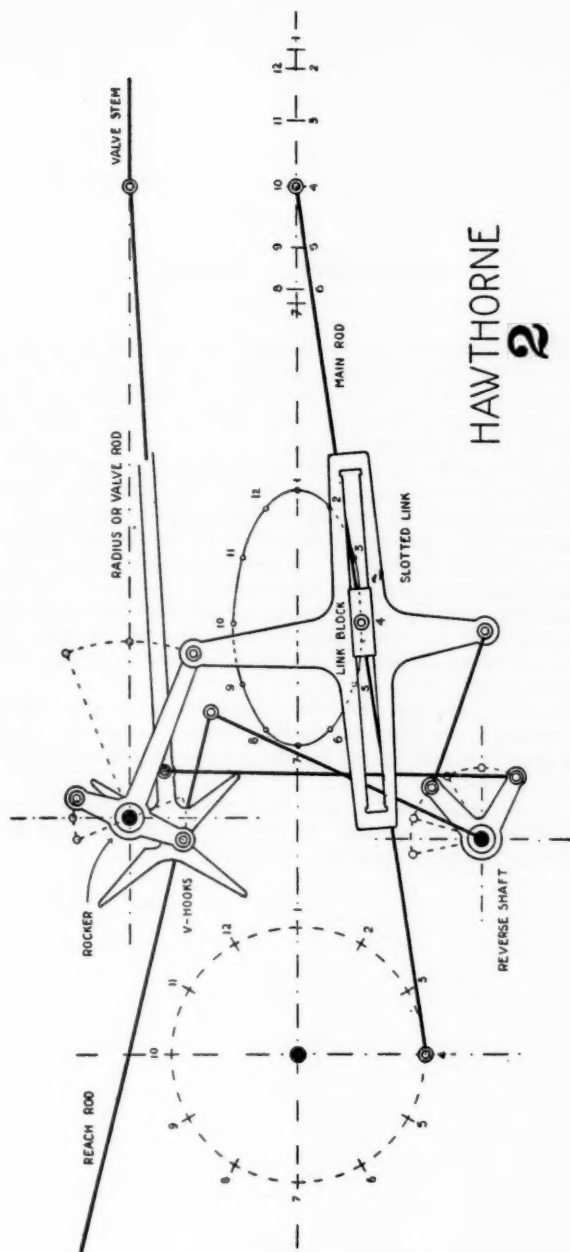
The reversing mechanism lowers or raises the radius- or valve-rod and its V-hooked end, to engage the latter in the lower or upper pins of the rocker, thereby placing the engine in forward or back motion. The up and down motion of the slotted link gives the rocker its motion as indicated.

The reverse- or tumbling-shaft arm, when moved to either end of its throw, also changes the slant of the slotted link, though to only a small extent.

While the Hawthorne motion is stated by some writers to have given fairly good results, it would seem that it offered little or no superiority over other existing hook motions. Neither gave the advantage of expansive working, which came a few years later with the Stephenson, Gooch, and Allan links.

One hesitates to dwell on what might happen to this strange contraption, with all its weight hung on the middle of the main rod, if the train were to get out of control in the descent of a heavy grade.

Hawthorne's gear was mechanically weak. Later (1870) Joy used a point on the main rod from which to drive his radial gear; a much simpler motion. At the same time this very feature proved to be one of the weak points in the Joy motion.



HAWTHORNE
2

CARMICHAEL. (ROLLER)

(Dwg 3)

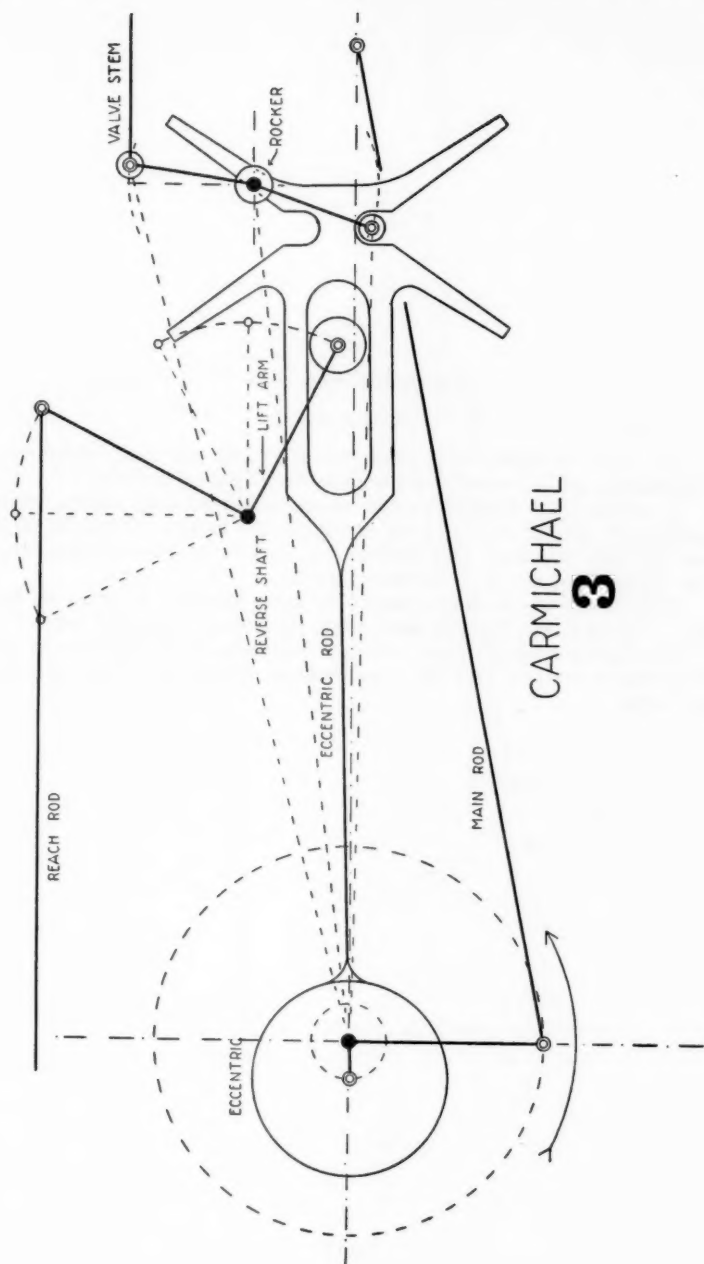
This single eccentric, double V-hook motion was used in 1818, by Carmichael, of Dundee, Scotland, in some ferry boats on the Firth of Tay. It was later built with a number of modifications by Gurney, Forrester, Renie, Cavé, Dunham, and Baldwin. The roller type here shown is from Cavé's design of 1835.

As can be seen, the lift arm has at its outer end a roller, over which the widened and slotted front end of the eccentric rod travels. Reversing is accomplished by raising or lowering this eccentric rod end, which is integral with the two V-hooks. This causes the engagement of either top or bottom hook with the top or bottom pin of the rocker. One of these gives direct, and the other indirect, motion to the valve.

This motion could be proportioned for lap and lead in both forward and back gear, and was much simpler than any of the later gears employing two or three eccentrics per cylinder; but it could not provide for variable cut off.

One disadvantage was that the roller had to be of a diameter less than the width of the slot, due to the vertical motion of the forward end of the eccentric rod, caused by the greater or less angularity of the back end of the rod.

Also, as disengagement of the hook with its respective rocker pin did not insure the engagement of the other, an auxiliary hand gear often had to be used in starting.



CARMICHAEL. (2)

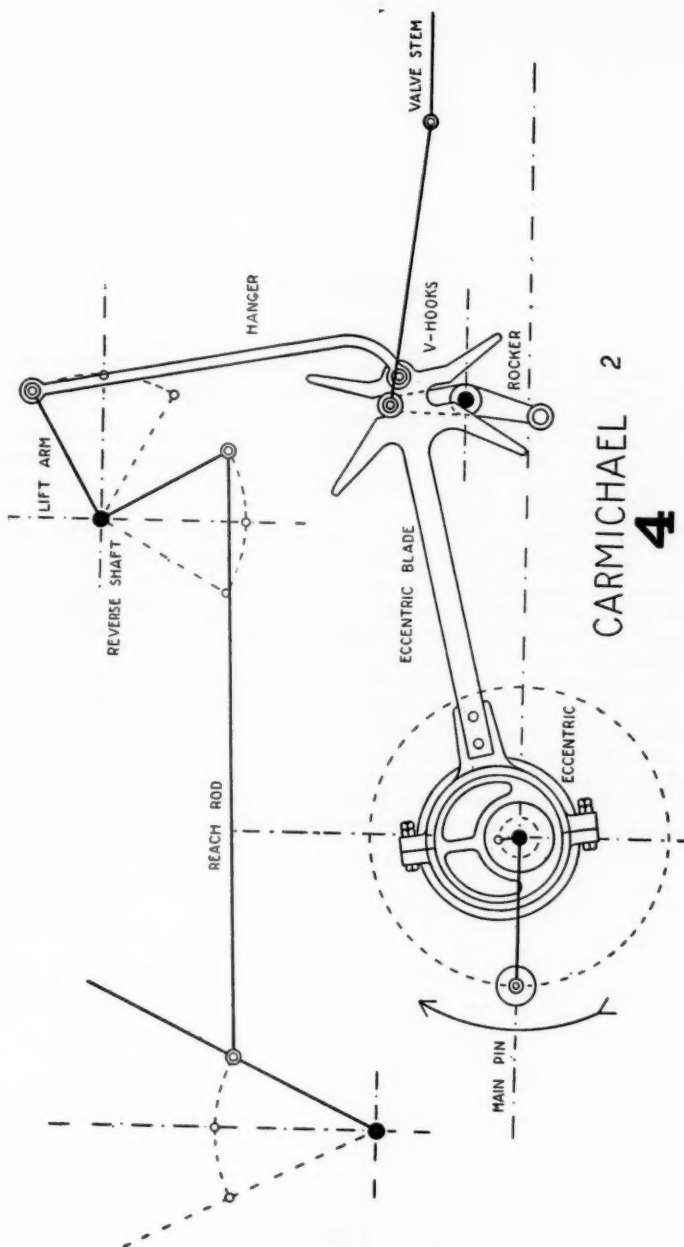
(Dwg 4)

The form of Carmichael gear here shown is one used on many of Stephenson's early locomotives and was first applied in 1835.

It differs little from the roller arrangement already shown, except that in this design, owing to the swing of the hanger, the bulk of the wear between the hook and rocker pin, due to vertical motion, takes place when the gear is in forward motion.

This is one of the large family of hook motions invented in both the U. S. and Great Britain, and needs no further comment here.

The double hook motions, with two eccentrics instead of one to each valve, finally evolved into the more modern Stephenson link, of which more later.



CARMICHAEL 2
4

CRAMPTON

(Dwg 5)

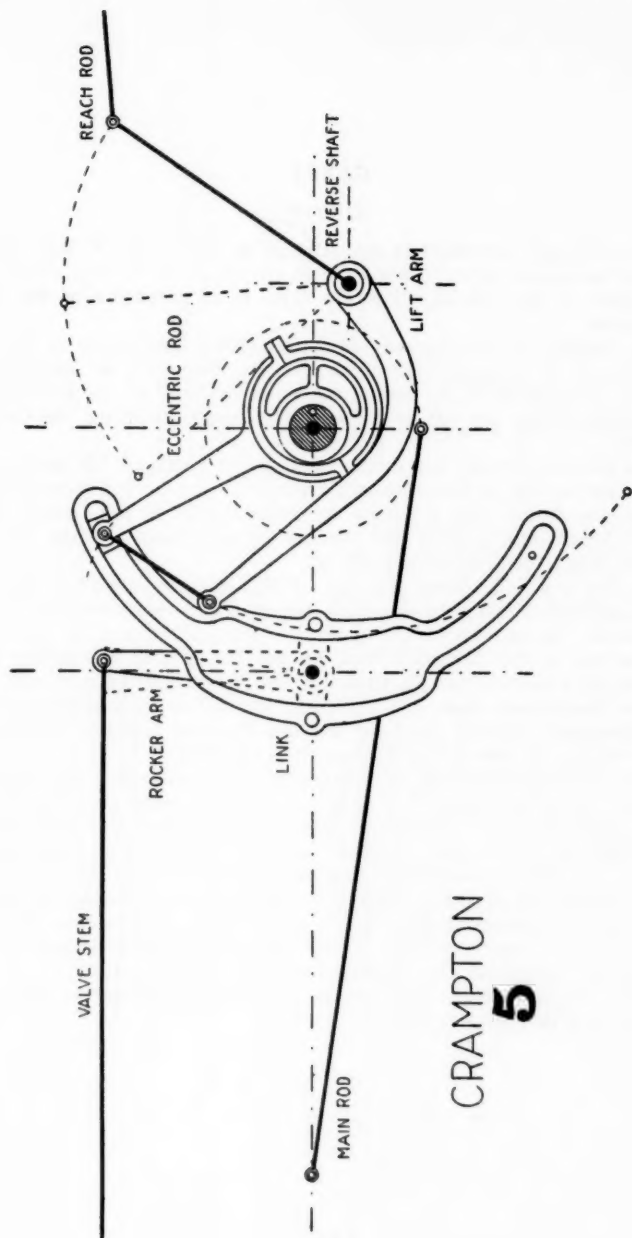
The name of Crampton is better known in connection with the type of single rear-driver locomotive named after him and which, for many years, was so popular in France.

Crampton's valve gear, which he invented in 1842, was a variable cut-off motion worked from a single eccentric. The link and rocker arm are very similar to those in Walschaerts' earliest gear, which came out a couple of years later.

In Crampton's motion, the throw of the eccentric and travel of the link block pin being constant, it is apparent that cut-off occurs later as the block approaches the center of the link; so that, as with Walschaerts earliest gear, and also with the Cabry variable cut-off hook motion, the farther the reverse lever is moved from the middle of the quadrant, the earlier the cut-off.

The Crampton has the disadvantages of, first, the long and curved lift arm from the tumbling shaft and, second, a short eccentric rod. Another is that, in the positions of early cut-off (with block at, or near, the ends of the link), the rise and fall of the engine on its springs produces serious disturbance in steam distribution at the valve.

As both Stephenson and Walschaerts gears came into use about this time, the Crampton motion was soon forgotten.



CRAMPTON
5

CABRY

(Dwg 6)

This French motion was an attempt to make the V-hook into a variable expansion gear. This is done by means of a long slot in the upper part of the V-hook, which, in turn, is an extension of the lower rocker arm.

By raising or lowering one of the eccentric blade pins in this slot the valve travel is lengthened or shortened. Reversing is accomplished with one reverse lever, its reach rod being coupled to the back-up lift or tumbling shaft, the lift arm and its hanger supporting the back-up eccentric.

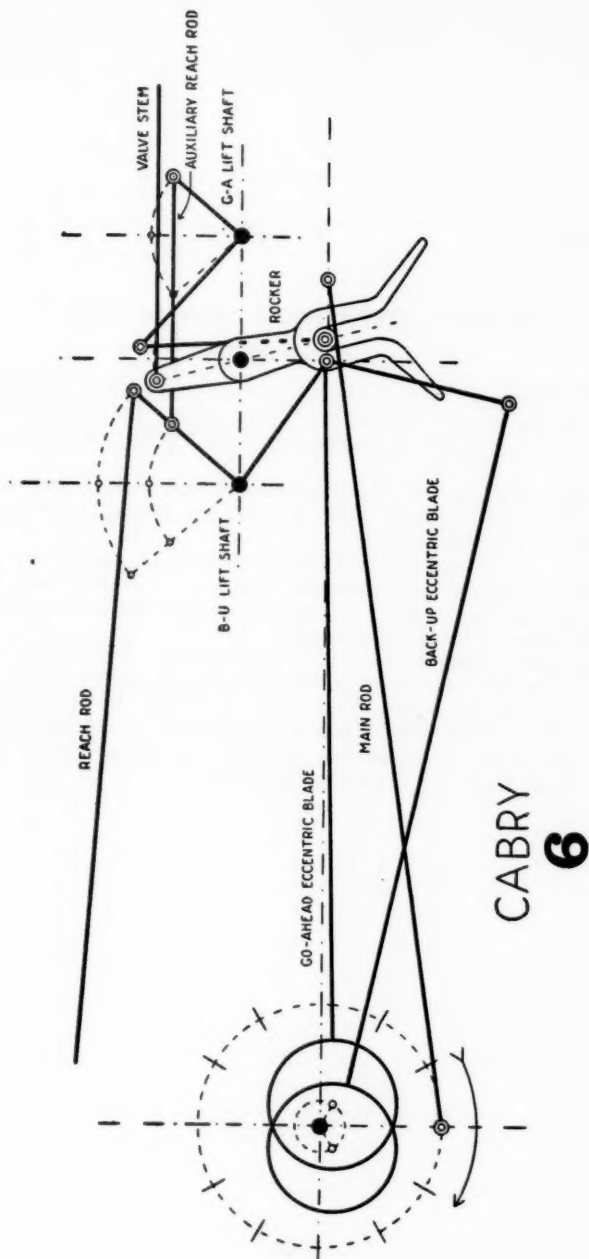
An auxiliary reach rod connects with the go-ahead lift shaft, arm, and hanger for the go-ahead eccentric rod pin. As one pin moves up, the other moves down. The eccentric rod ends should be far enough apart for the lower one to clear the bottom of the V-hook, when the one engaged is set for the earliest cut off.

In the position shown the top of the back-up eccentric rod pin hanger appears directly in line with the go-ahead eccentric rod. There is, however, no connection between the two, as the pin of the latter is at the top of the slotted V-hook on the far side of the rocker arm. The back-up eccentric rod pin slips into the V-hook on the near side.

The illustration shows the motion as applied to some inside-cylinder 2-2-2 passenger engines built for the old Rhenish Railway (Holland), by the Societe du Renard, a Belgian firm, in 1843.

The Cabry motion had been invented some years, but the Stephenson link was so far ahead of it as a variable expansion gear that it had little chance for a wide adoption. One of its serious drawbacks was the fact that, due to the fixed angular advance of the eccentrics, an increase in the valve travel meant that as the eccentric rod pin was drawn to the upper end of the V-hook slot, the lead was thereby increased. With the Stephenson motion (with open rods) an increase of valve travel, in other words a later cut-off, always meant a decreased lead with its greater power for starting and slow heavy pulling.

Some of the other early gears, notably Walschaerts' first one, suffered from this same failing.



V-HOOK, STEPHENSON (prior to 1838)

(Dwg 7)

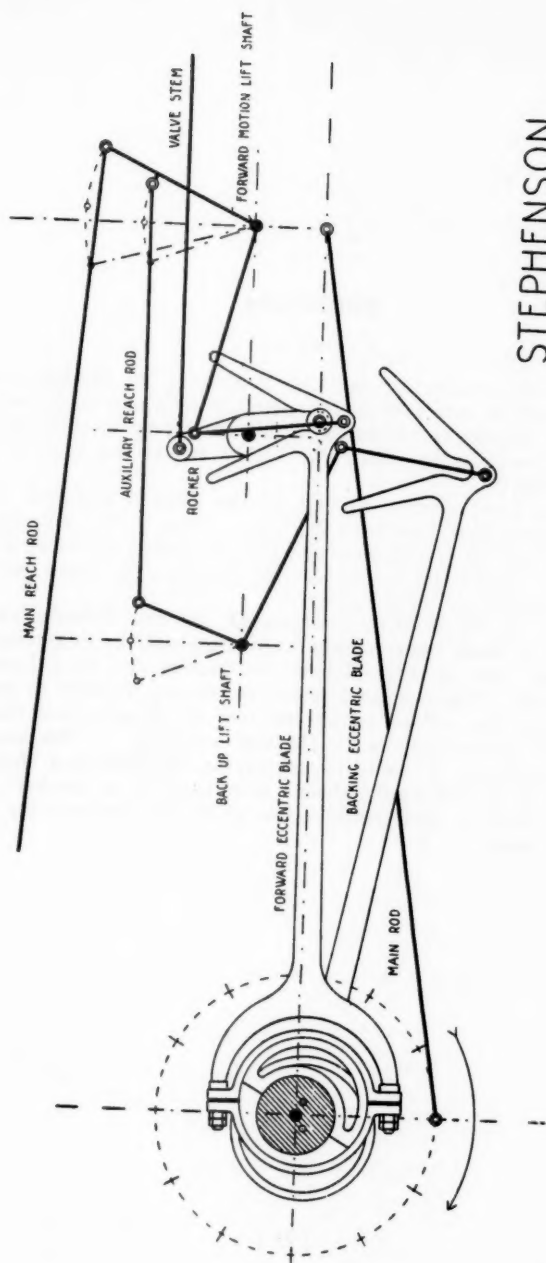
This V-hook, or "Gab" motion as it is called by our British cousins, was one of the many varieties used prior to the invention of the link motion. It was applied to locomotives built by the Stephensons before 1838.

In this gear, as with the conventional link motion, two eccentrics are used for each cylinder. Both V-hooks are swung below the rocker, and both open upwards.

By the use of two lift shafts connected by an auxiliary reach rod, the forward ends of the eccentric rods can be raised and lowered, causing one of the hooks to engage the pin of the lower rocker arm, while the other is being disengaged.

This rather cumbersome system of reversing levers, which was very similar to Cabry's, was superseded by the much simpler double V-hook, integral with the valve-stem, brought out by Robert Stephenson, in 1841.

The 1841 double V-hook was a fore-runner of the link motion, as will be seen from its description in following pages, but no provision had yet been made for expansive working.



STEPHENSON
7

BUDDICOM

(Dwg 8)

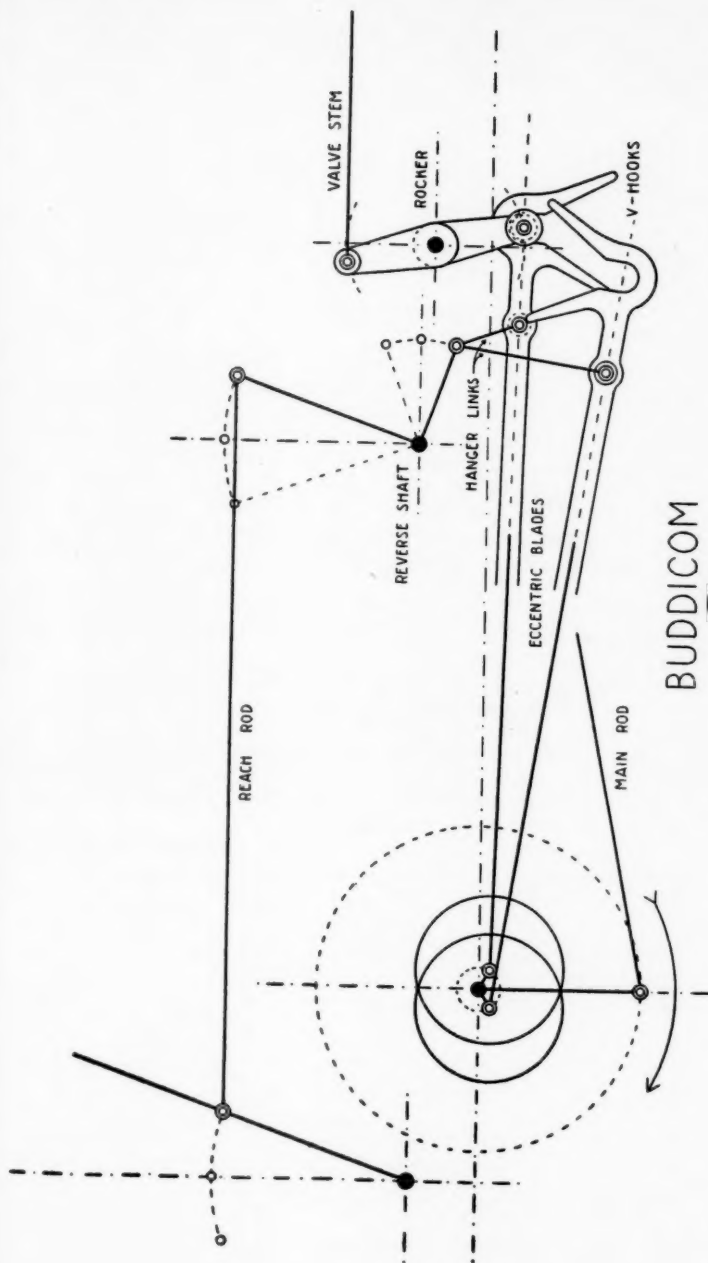
This V-hook motion was used by Buddicom, an English engineer, in 1841. It will be seen that, as the eccentric rods and hooks are raised or lowered to engage the rocker pin, this form may be used for either direct or indirect motion. Only the bottom rocker pin is used for the hook connection.

The gear is so similar to that of the French engineer Pauwels (1840), that they may have been one and the same. The only apparent difference is that in Buddicom's the hanger links supporting the rods are connected behind the hooks, while in Pauwel's the hooks were hung from their forward or outer ends.

A glance at the relative positions of the two V-hooks when the crank pin is on either quarter, may have suggested the Stephenson link.

It is true that, in 1841 Robert Stephenson said to a Locomotive Superintendent, "There is no occasion to try any further at scheming valve motions. One of our people has now hit upon a plan that beats all the other valve motions." He was referring to the soon-to-be-announced discovery of two of his employees, Williams and Howe.

V-hooks of a very similar design were used for a number of years in America, where a cold shoulder was given link motions for another eight or ten years.



BUDDICOM
8

DROP HOOK

(Dwg 9)

One of the earliest of valve gears was the Drop Hook. It was used by one of pioneer British locomotive builders, Edward Bury, of Bury, Curtis & Kennedy, of Liverpool. Bury was famous for his discovery of the bar frame, which was largely used by his firm.

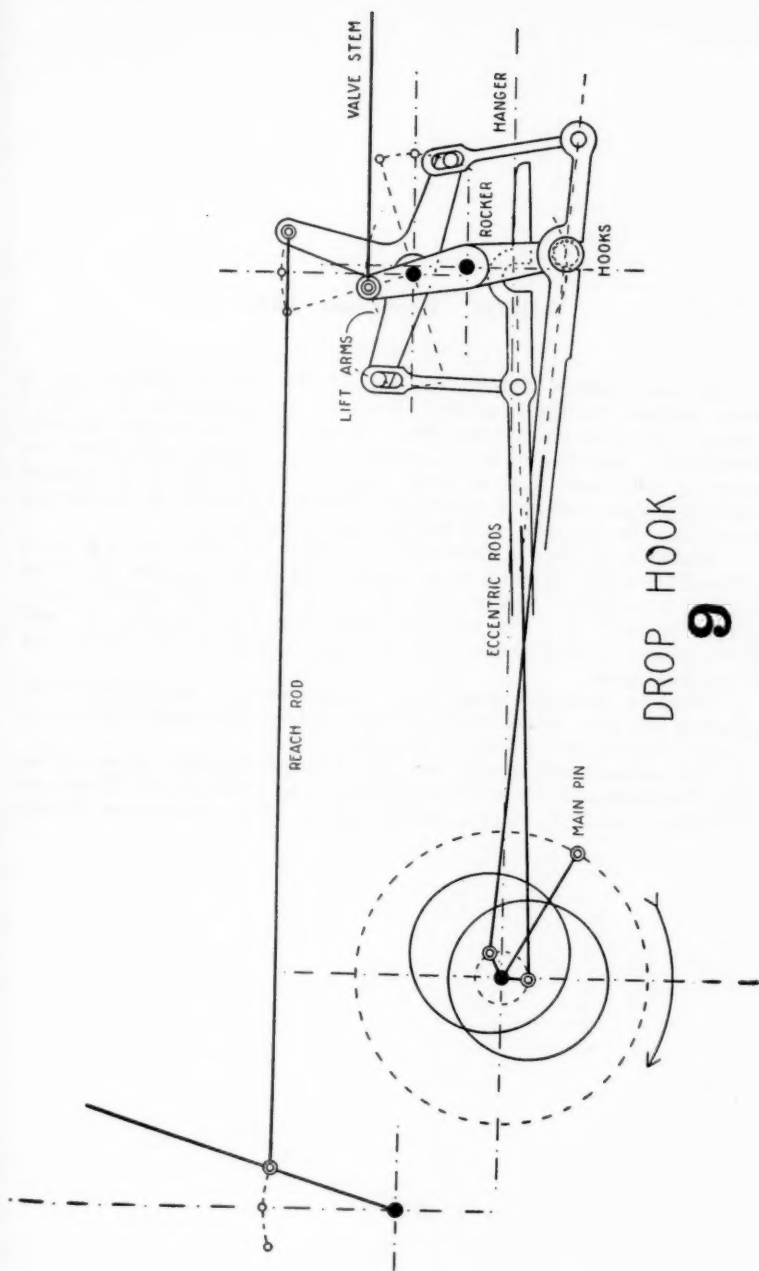
In the original form of this motion each hook was raised and lowered independently, four levers being necessary. One moved the valve rod to a point where the notch came over the pin, while another brought the notch and pin together. This was repeated for the other side.

This arrangement of four starting bars was cumbersome and slow. It was used by several of the early American builders, and soon evolved into the form shown.

Moving the reverse lever raised, and held, one hook off the rocker pin while the other was dropped into place. Starting bars moved the valve rods till they came into position.

At higher speeds the hook and pin sometimes parted company, so eventually the drop hook gave way to the V-hook, which served for a number of years, sometimes in connection with an independent cut-off, until the adoption of the Stephenson link.

The diagram shows the reverse shaft through the upper rocker arm. It is, of course, in a different vertical plane from the latter.



DROP HOOK
9

V-HOOK (Stephenson, 1841)

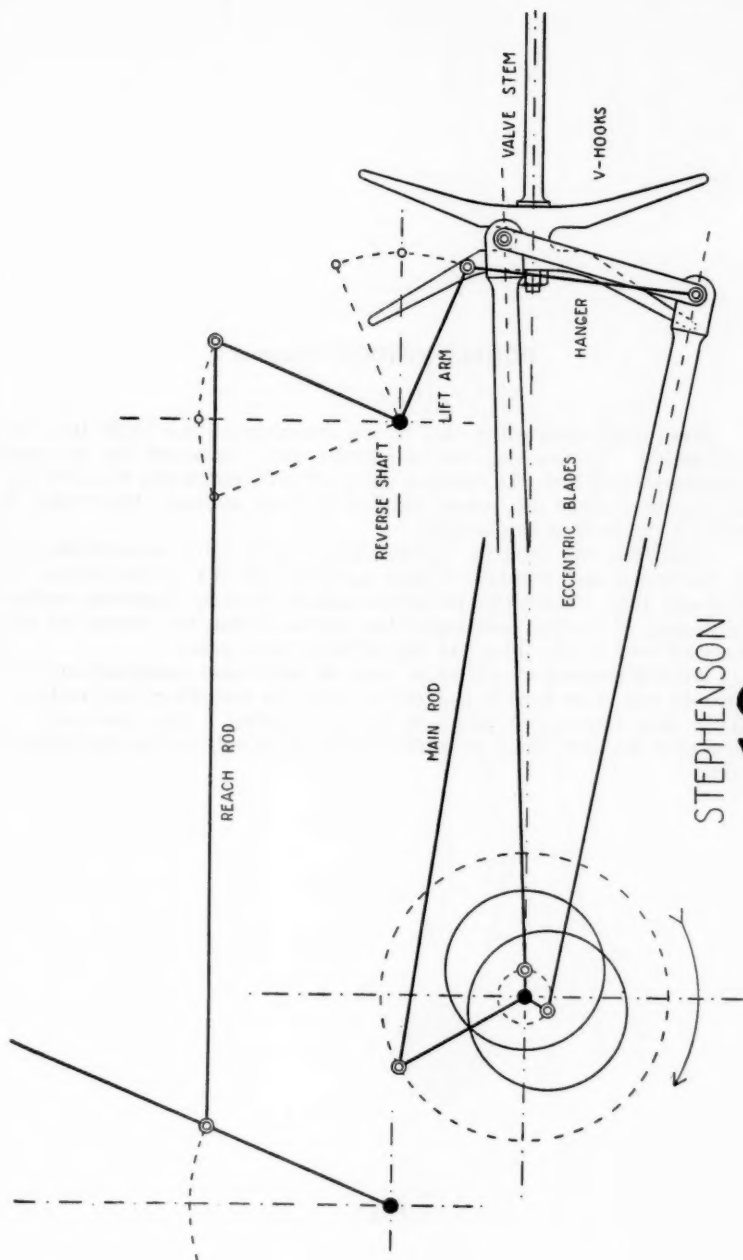
(Dwg 10)

In 1841, Robert Stephenson, son of the famous George, and a noted engineer in his own right, invented a double-hook, or "Gab," motion. The two hooks were made in one piece which was securely bolted to the back end of the valve-stem. The forward ends of the two eccentric rods were kept in their respective positions by a straight connecting link; and were raised and lowered by means of the hanger connecting the lift arm with the backing eccentric rod.

Insofar as steam distribution is concerned, this plan was not much of an advance over existing hook motions, but it *was* simpler, and what is more, it contained within itself the germ of the link motion, which so soon followed it. The straight connecting link between the ends of the two eccentric rods received the same motion as the curved link of the later gear.

When in operation there was a slight vertical movement of the eccentric rod pins in the short, straight slots of the hooks, due to the swing of the suspension link, or hanger.

This arrangement was in use only a couple of years, when the so-called Stephenson link motion was arrived at by Williams and Howe, one a draftsman, and the other a pattern-maker, at the Stephenson Works.



STEPHENSON
10

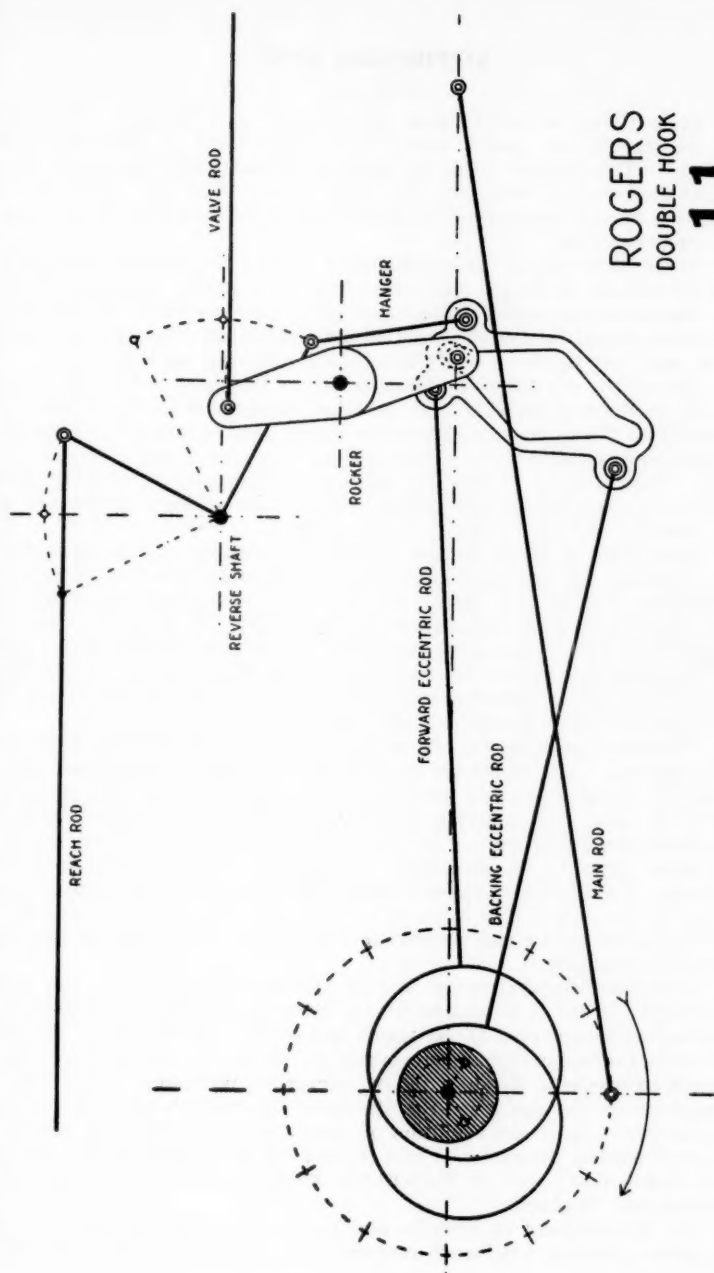
DOUBLE V-HOOK (Rogers)

(Dwg 11)

Here is an interesting step in the evolution of the hook- into the link-motion. In this one the two hooks were connected by an open diamond-shaped link, the opening being of sufficient width to allow for clearing the rocker pin, when running in back motion. Otherwise, it calls for no further explanation.

This form was used by Thomas Rogers even after his introduction of the Gooch and Stephenson link motions into the United States in 1848 and 1849. The bitter prejudice against these by American motive power men of the day was, more than anything else, the reason for the carrying over of the older and less efficient valve gears.

An independent cut-off valve, with its additional complications and controls, was often used in connection with this and other hook motions. Alone, this Rogers link was not far from being a true link motion, except for the fact that it provided for cut-off at only one predetermined point.



ROGERS DOUBLE HOOK 11

STEPHENSON LINK

(Dwg 12)

D. K. Clark, in his "Railway Machinery," of 1855, says: "Nothing but an impulse of genius could have given birth to this exquisite motion." This tribute voiced the opinion of practically the entire locomotive engineering fraternity for many years. The net result of its invention was its application to more locomotives than that of all other types put together.

There have been so many exhaustive works on the Stephenson gear, and its various means of application, that it is hardly necessary to go into theoretical or technical discussion of its features here. To the layman these would be dust-dry, and to the mechanical engineer, needless; so we will just touch on one point before outlining its history.

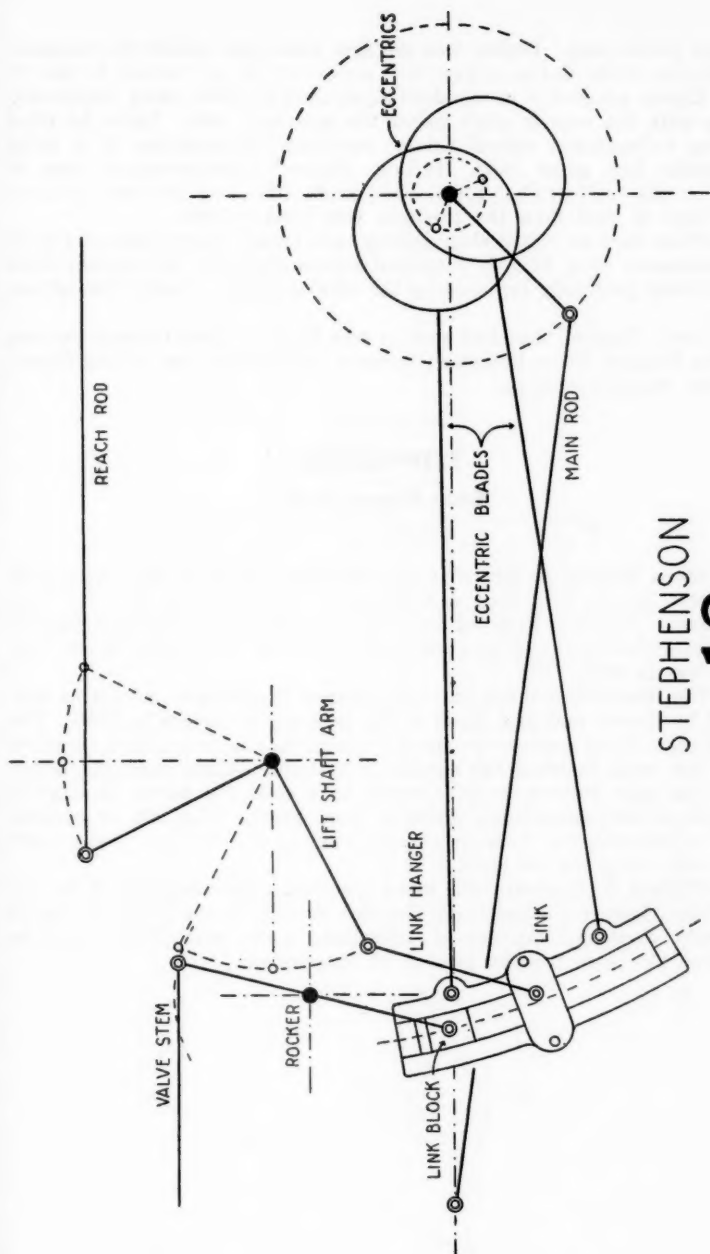
One of the characteristic features of the Stephenson link motion is that it provides a variable lead, in other words that as the motion is "hooked up," and the valve travel shortened, lead is increased. Whether or not this peculiarity is an advantage has long been a subject of controversy. Talk to many an old-time engineer though, and you will find him a warm advocate of the link motion and its variable lead, as opposed to the constant lead of the more modern gears.

Regardless of which opinion is right, the coming of heavier motive power, mainly for reasons of good design, eventually forced valve motion outside the frames and, except for small or old engines, it has stayed there, another case of the survival of the fittest. Even in the case of Walschaerts gear, means have been provided to give variable lead. Before dropping this phase it might be stated that the advantage of variable lead also brought a corresponding drawback in getting the steam out of the cylinders, when hooked up and running fast.

Volumes have been written on the subject of who first invented the "link motion," a term always applied to the so-called Stephenson link. It was first introduced, and generally used, by the Stephensons, in 1843. Hence its name. In America, consensus of opinion attributes the first invention of the link motion to William T. James, of New York, a good ten years prior to its invention in England. He had offered it to Forrester & Co., with negative results. James applied the motion to a locomotive he built. The boiler of this engine unfortunately exploded, destroying the engine and its motion, and James did nothing further in locomotive building.

Later investigation seems to indicate that Williams was the real re-inventor of the link motion at the Stephenson Works, despite the disparaging remarks of D. K. Clark and Zerah Colburn, both prolific writers on the locomotive and steam engine. Much matter has since come to light to discredit Howe, a fellow worker of Williams', in his effort to appropriate the credit for the discovery. In reality, the link motion was the final step in the evolution of the double eccentric hook motion; and, with skillful designing, it held its own till about 1900, when outside gears, particularly that of Walschaerts, began to make inroads in both America and England.

On the continent of Europe, and in America, the link motion was not given a hearing until some years after its rapid adoption by British



STEPHENSON
12

motive power men. Rogers was the first American builder to recognize its merits, while Baldwin was very persistent in his refusal to take it on. Rogers adopted it as standard equipment in 1850, using underhung links, with the reverse shaft below the eccentric rods. Later he tried adding independent cut-off valves, involving the addition of a third eccentric; but, after 1862, Hudson, Rogers' superintendent, used it only in the conventional form. Not until 1857 was Baldwin induced to accept it, and then the pressure was from outside.

From then on it had clear sailing, and though many patents for its improvement were filed, it remained substantially in its original form until being gradually replaced by the outside gears. Today it is seldom seen.

Note. Rogers' first link motion was fitted in 1848 to some engines on the Hudson River Railroad; however this motion was of the Gooch, not the Stephenson type.

STEPHENSON

Early Rogers Type

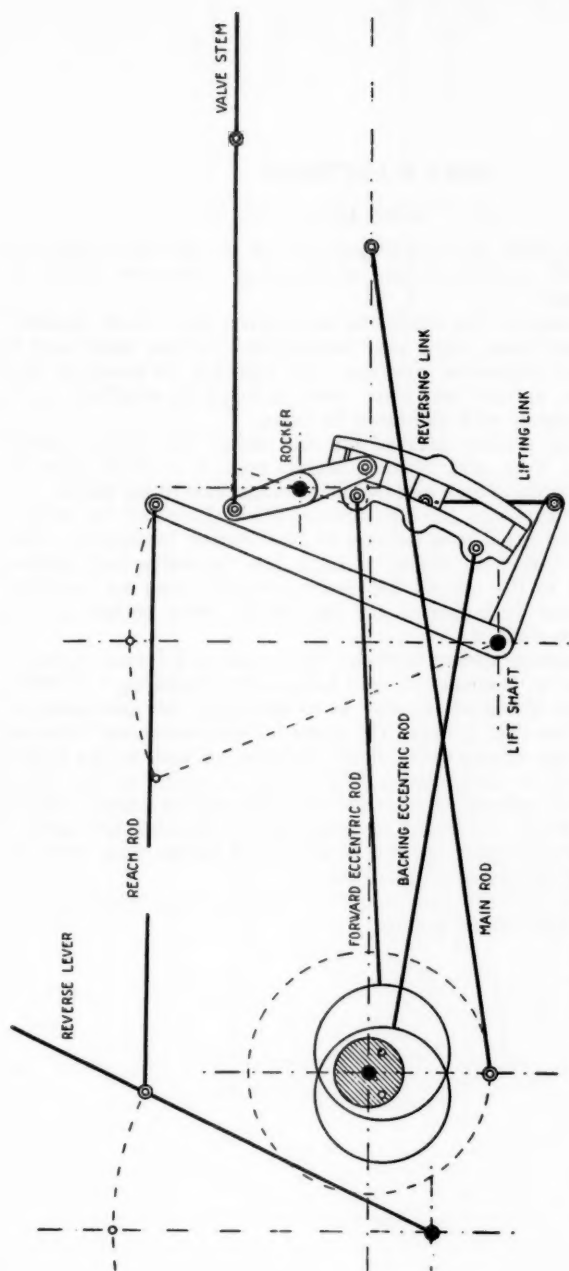
(Dwg 13)

When Thomas Rogers first applied link motion to the locomotives built by Rogers, Ketchum & Grosvenor, it was the Gooch link that was used. In this motion the link was supported by a swinging hanger, the connection to the lower rocker-arm being by means of a radius rod. This was in 1849.

The illustration shows the conventional Stephenson motion as supplied by Rogers and first fitted to the company's engines in 1850. The advantage of this motion over that of Gooch was that it required considerably less room between the eccentrics and steam-chest than the latter.

The only feature in this design that calls for notice is Roger's method of link suspension, which is from below. The lift, or reverse, shaft is beneath the frame, making necessary a long arm to the reach rod, and a long reverse lever.

William S. Hudson, who was appointed superintendent of the re-organized Rogers Locomotive & Machine Works, on the death of Rogers in 1856, continued the use of underhung links until 1862, when he adopted the more modern method of suspension.



STEPHENSON
EARLY ROGERS TYPE

UHRY & LUTTGENS

(Dwg 14)

From 1859 to 1885, H. A. Luttgens served the Rogers Locomotive Works as its Chief Draftsman, one of his many inventions being the valve gear here shown.

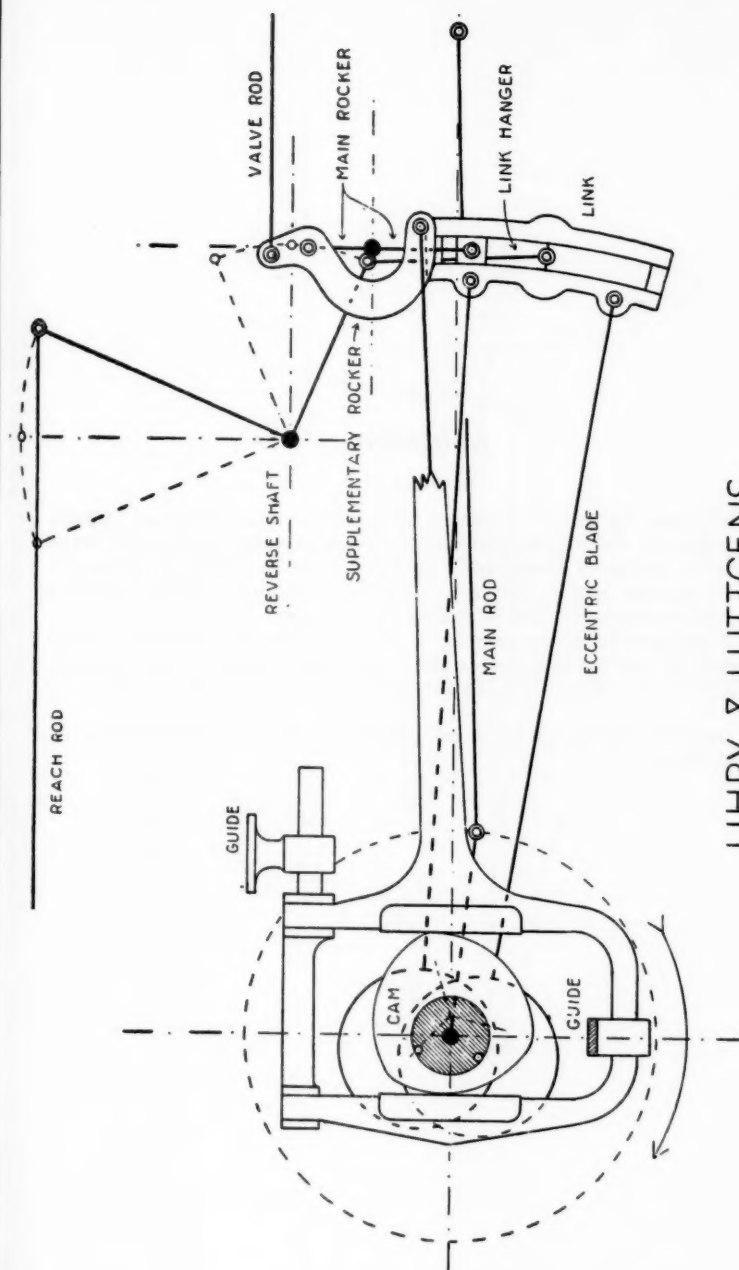
In the early days of the American locomotive, the "Hook Motion" days we might call them, some very complicated devices were used in order to arrive at expansive working. In addition to go-ahead and back-up eccentrics, a third was often used to drive an auxiliary valve or slide in conjunction with the main D valve.

After the link motion arrived on the scene, this riding cut-off persisted for some time, and Thomas Rogers used it in 1854, after he had begun applying the Gooch and Stephenson motions to his valves.

In 1866, Luttgens and his co-inventor, Uhry, patented the motion here shown. It was fitted to a Central of New Jersey locomotive. The usual Stephenson link with rocker is used, but the valve rod, instead of being attached to the top of the rocker, worked from an auxiliary rocker. This rocker fulcrums at the top of the main rocker, and is curved in order to clear it.

The supplementary rocker is worked by a cam and frame. Quoting from M. N. Forney's "Locomotive and Locomotive Building," of 1886; "The effect of this action of the cam is to accelerate the movement of the valve at the time that it opens the ports for admission and exhaust. Its adjustment is the same as that of the link-motion and, at the higher grades of expansion, it gives about 50% greater opening of the steam port. The point of exhaust is retarded from five to six inches beyond the link-motion, while the point of compression remains the same." The size of the exhaust port opening is somewhat larger than with the link motion and it is opened in less time.

This gear got nowhere, the cam and frame arrangement proving unsatisfactory in high speed service.



UHRY & LUTTGENS
14

ANDERSON

(Dwg 15)

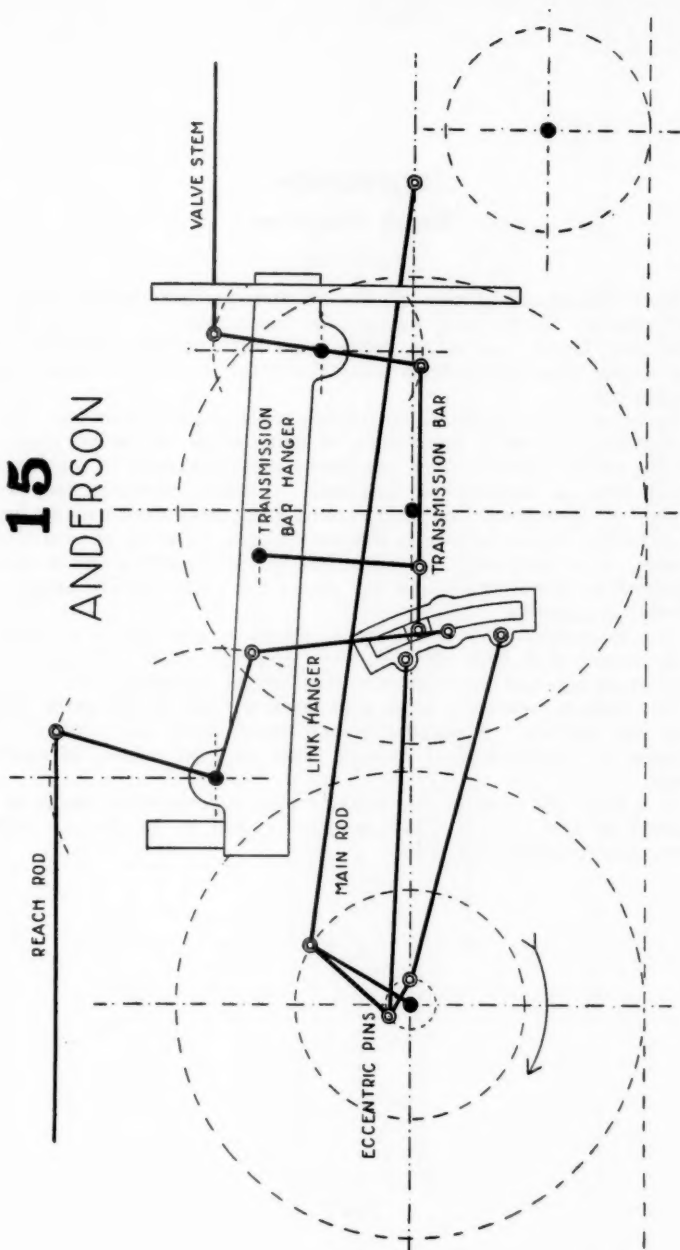
This gear by J. A. Anderson is nothing more than an outside arrangement of the Stephenson link-motion with a two-pin return crank in place of the usual eccentrics. It was evidently designed for multi-drivered engines, and to do away with the long and crooked eccentric blades and transmission bars necessary in most cases.

All the motion being outside, it is hung from an auxiliary frame supported by two yokes bolted to the main engine frame. This arrangement is very accessible, and makes possible better bracing of the main frame.

Though it was used on a few Baltimore & Ohio locomotives, its life was short.

15

ANDERSON



STEPHENSON

French Adaptation

(Dwg 16)

This French adaptation of the Stephenson link motion calls for little comment. In the early years of the link motion, all three varieties, Stephenson, Gooch and Allan, when used with outside cylinders and steam chests, were driven from eccentrics fitted to a return crank from the main pin.

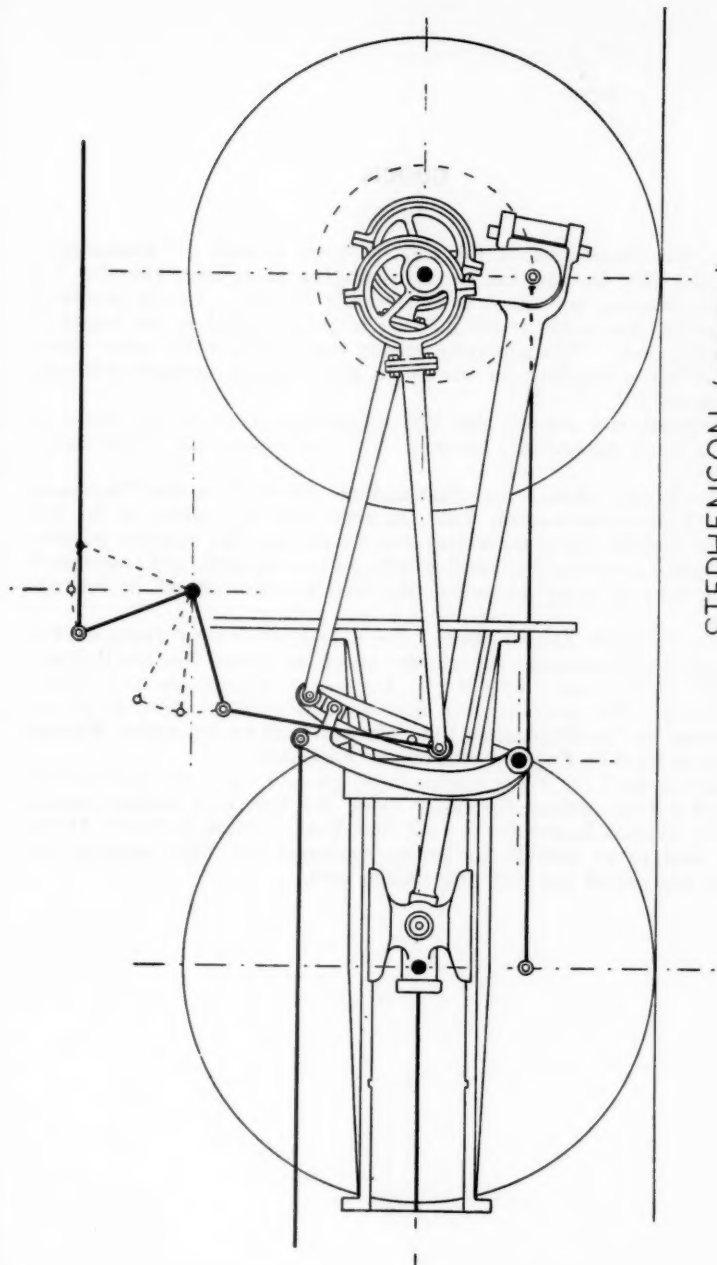
In order to give a straight line drive, where steam chests were above the cylinders, the valve seats were, in many cases, set at an angle to avoid the use of a rocker. This was done a great deal more in continental Europe than in America or England. Outside eccentrics too, were prevalent in these countries, where trains and power were usually light.

A design frequently used in France is shown, in which the valve seat lies level, or parallel with the center line of the cylinder; one in which the motion is direct, or without the use of the rocker which became so universal in America.

The valve-stem lever in this type of gear acts mostly as a support, for the reason that both the link block and valve-stem connection are almost at its top, and the stresses at its fulcrum practically nil.

The example shown is from a locomotive built in the early fifties of the last century. A number of engines so fitted were still in use just prior to World War II, though these were, of course, of ancient vintage.

It is only fair to state that modern French locomotive design is as advanced as that of any other country, except as to size, in which respect America holds the palm.



STEPHENSON (FRENCH)

16

GOOCH

(Dwg 17)

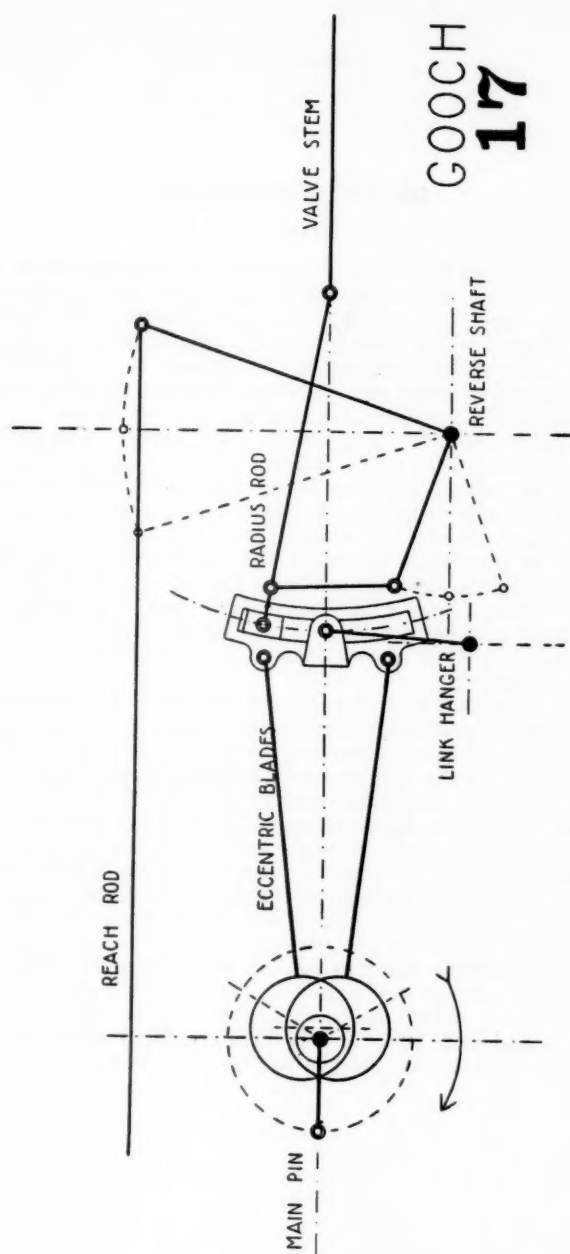
In the Gooch motion the link is often termed a "Stationary" link. Actually in addition to its oscillating movement, the link has a slight swinging movement as can readily be seen. In the design of this motion, the radius of the link arc is always equal to the length of the radius rod. This generally means that considerably more space fore and aft is required for the Gooch gear than is necessary with the Stephenson.

Reversal and cut-off, also link suspension, may be by means of either over- or under-slung hangers. The illustration shows both underhung.

The Gooch, while a true link motion, differs from the Stephenson in that it provides constant lead. In some cases the center of the link is hung slightly below the center line of motion, the angular advance of the backing eccentric reduced a little, and its eccentric rod lengthened. This is done in order to reduce slip and equalize cut-off in forward motion.

The inventor, Daniel Gooch, was a brilliant young engineer who was appointed locomotive superintendent of the Great Western Railway, in 1837, at the tender age of 21. He was a contemporary of Robert Stephenson. The gear he developed was designed in 1848, as an improvement on the Stephenson link. It was used by the Great Western and other lines in England and on the continent.

Mainly used for direct motion valve gears it has been also used for indirect motion, among the latter being the first link motion engines built by Thomas Rogers for the old New York Central, in 1849. It was often used as an outside motion on comparatively light engines, but its day has passed and it is now seldom seen.



GOOCH 17

DURANT-LENCAUCHEZ

(Dwg 18)

Though George Henry Corliss invented his peculiar system of valves in 1849, it was not until about forty years later that experiments were made with a view to adapting it to locomotive practise. The Paris-Orleans Ry., one of the leading French lines, in 1890, applied a motion incorporating Corliss valves, worked out by Durant & Lencauchez; a considerable saving in water and coal consumption, and a like increase in speed being attained under identical load and conditions.

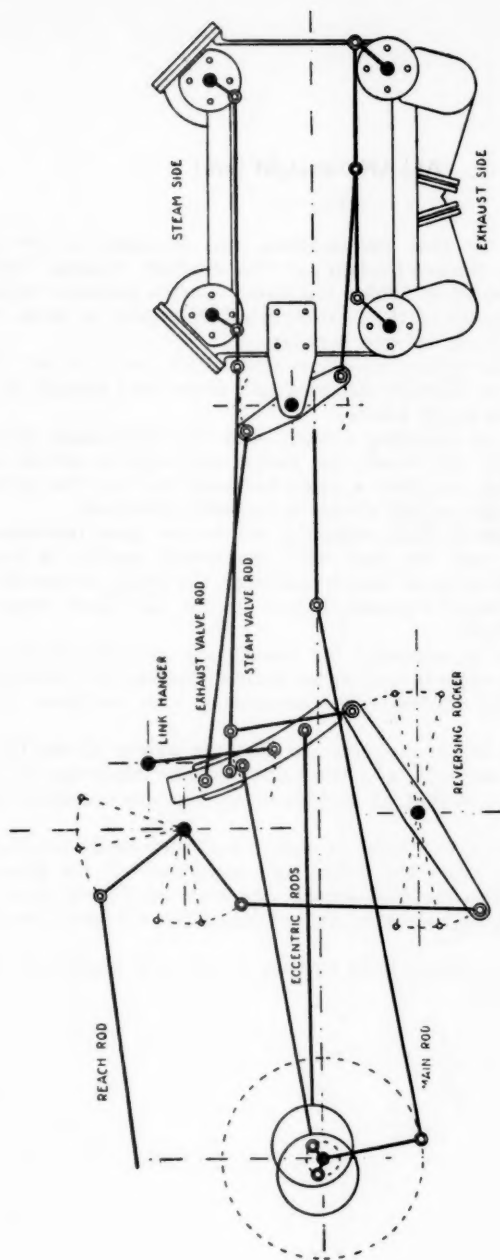
The gear seems to have proven satisfactory. The independent exhaust valves cut down high compression, live steam passages were not subject to the cooling influence of exhaust steam, clearance space was reduced to the minimum, and the sharp opening and closing of steam ports eliminated the wire drawing of incoming steam.

After its apparently successful trial on the P. O. line, this valve gear was applied to locomotives of the Eastern Ry. of France, and the P. L. M. (Paris, Lyons & Mediterranean) lines; but during the '90s compounding had become very popular and, while the Durant-Lencauchez gear got off to a good start, it was soon eclipsed by the four-cylinder compound.

In the example shown, as applied to a 2-4-2 P. O. passenger engine, the Gooch motion was used, driven by two eccentrics mounted on a return crank. This method of drive was much used on the continent for outside motions of the Stephenson, Allan, and Gooch types.

The valve rods, both steam and exhaust, are driven from the same link block, the pin for the exhaust rod being above that for the steam rod, and moving a greater distance than the latter in all positions of the reverse lever when running forward. This feature allowed a prolonged opening of the exhaust valves. Conversely, when running tender first, the opposite effect would be the result, for the exhaust steam would be held in the cylinders due to the shortened exhaust period, the exhaust pin being closer to the link center than the steam pin.

This disadvantage would prohibit the use of the gear on switching, suburban, or any other locomotives that had to be run in back motion with any considerable load. It was therefore, fitted mostly to passenger engines, and then not beyond the borders of France.



DURANT-LENCAUCHEZ 18

ALLAN (straight link)

(Dwg 19)

This, one of the true link motions, was invented by Alexander Allan, locomotive Superintendent of the Scottish Central Railway, at Perth, and patented in 1855. His name is often confused with that of Allen, the originator of the double-ported slide-valve so much in use before the piston valve became popular.

The Allan link motion came into fairly wide use, not only in the British Isles, but in Europe, America and elsewhere; though it never became popular for heavy power.

In reversing, or changing cut-off, with the Stephenson gear, the link is moved: with the Gooch, the radius rod only is moved: while, with the Allan link, we have a cross between the two, for both link and valve rod are moved, and always in opposite directions.

Another feature is that while the Stephenson gear increases lead when hooked up, and the lead with the Gooch motion is constant regardless of the position of the reverse lever, the Allan compromises by providing a very slight increase of lead as the link block approaches the center of the link.

This gear can be arranged for almost any position of the steam chest, and in some cases is used as an indirect motion, the forward end of what is normally the valve rod connecting with the lower arm of the rocker.

The lift arms are so proportioned that the weight of the link and eccentric rods on one side, and the valve rod and block on the other, balance each other; so that no weights or springs are necessary on the lift shaft.

This is a simple gear, light in weight and very easily handled. It requires less room below the boiler, and is farther off the ground in forward motion, than the Stephenson. As with the Gooch, more room is needed between driving axle and cylinder for the same length of eccentric rods.

Used mostly for fairly light engines, it has now passed out of the motive power picture.

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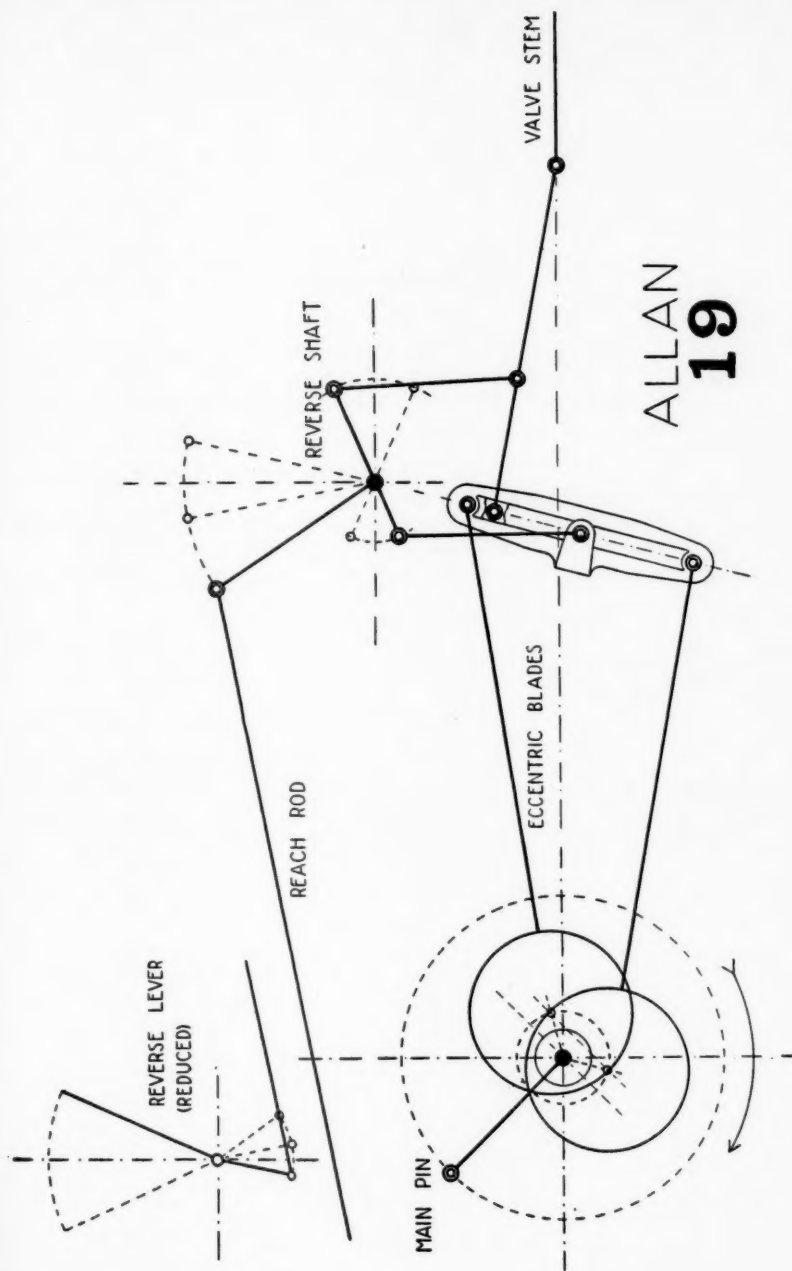
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ENGLEMANN

(Dwgs 20-1, 20-2)

About the time that Hackworth and others in England were attempting to improve on the Stephenson gear, Englemann, a German engineer, of Mulhausen, Alsace, came out with several motions, one of which might be termed a Stephenson gear without the curved link and sliding block. These two essentials were replaced by pin-jointed parts which, when properly proportioned, could be made to give results identical with the Stephenson gear.

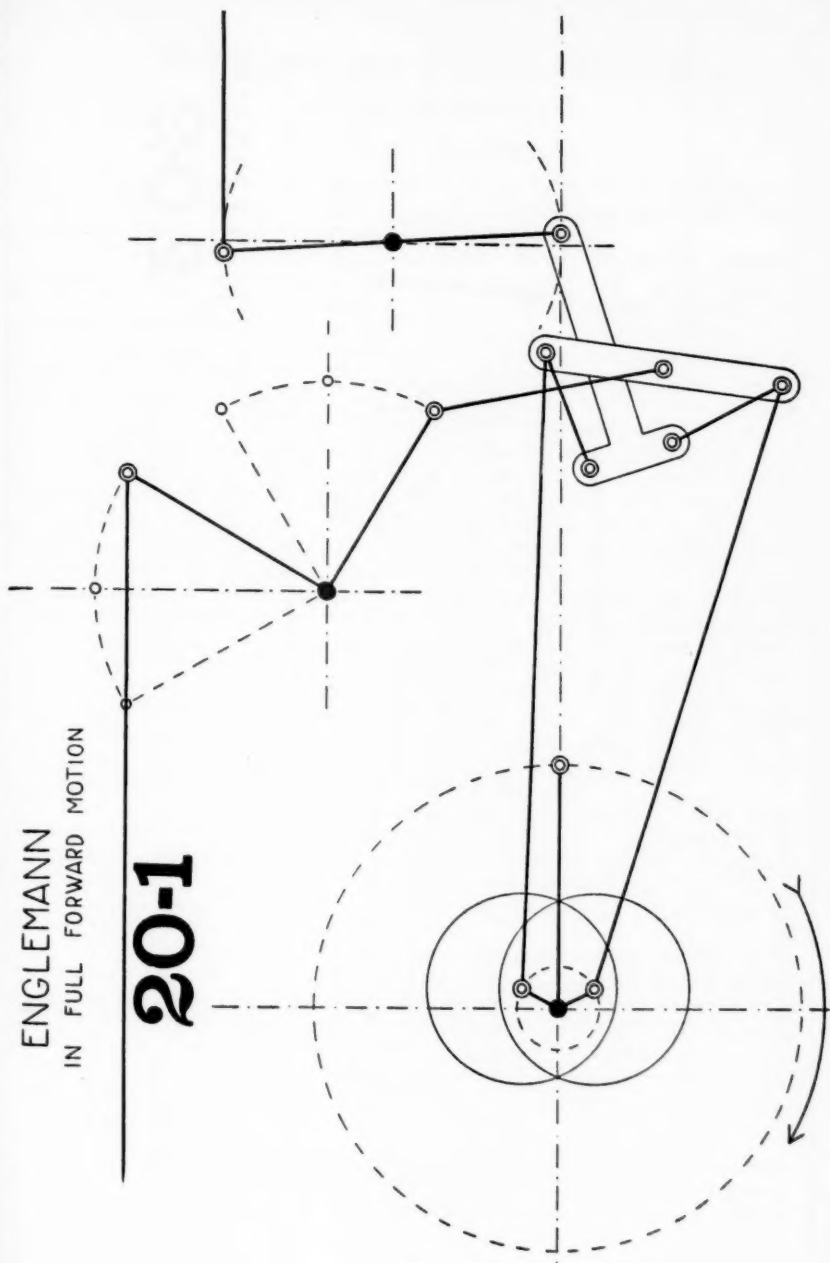
Two drawings are shown, one with the reverse lever in full forward motion, while the second shows it at the center of the quadrant. It will be seen that the amount of lead varies exactly as with the Stephenson link, being considerably more when the engine is cutting off close than when the reverse lever is dropped down in the corner.

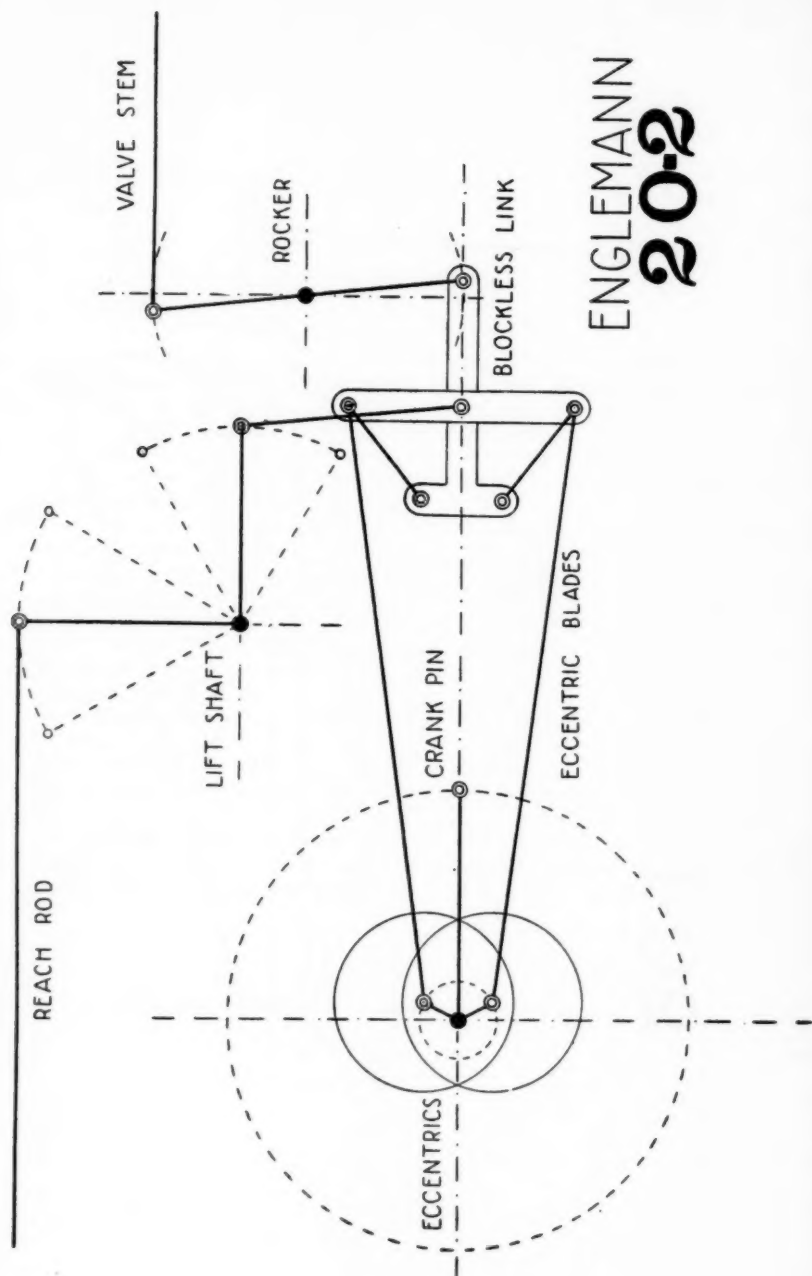
This motion of Englemann's has been included under the classification of link motions as it is, except for the pin-joint feature, so similar to Stephenson's.

Englemann's other gears, including a rotating eccentric-strap motion (to be shown later), were all pin-jointed, an attempt to get away from sliding surfaces. In doing so Englemann produced far more complicated mechanisms; consequently they were never taken up by builders. Hackworth, on the other hand, was much more successful in arriving at the simplicity so much to be desired, and several gears based on his designs later came into use on locomotives, marine and other engines of the reversible type.

ENGLEMAN
IN FULL FORWARD MOTION

20-1





ENGLEMAN
20-2

The Adirondack Railway Company

PASSENGER TRAFFIC

BY DAVID S. WEATHERWAX

Passenger service was inaugurated as far as Wolf Creek on December 1, 1865; Thurman, on June 21, 1869; Riverside, in 1870; and North Creek in 1871.

This class of traffic was never heavy except during the summer season. This began, roughly, about June 15th and ended about September 15th. The line ran through a sparsely populated mountainous region and there was not a large resident population to draw upon.

Connections were made with stages at Hadley, for Lake Luzerne, at The Glen, for Friends Lake, at Riverside for Schroon Lake, and at North Creek for Blue Mountain and Raquette Lakes and the steamers "Killoquah," "Utowana," "Towahloonda" and "Irocoia," operated thereon by the Blue Mountain and Raquette Lake Steamboat Line.

The southern terminal was at Saratoga Springs, a resort of wide renown for its mineral waters and horse racing and where connections were made with the Rensselaer & Saratoga Railroad (later the Delaware & Hudson Company) and the Boston, Hoosac Tunnel & Western Railroad (later the Fitchburg Railroad and Boston & Maine Railroad, successively). Therefore, during the summer months the passenger service was doubled and sometimes trebled. Through Wagner (later Pullman) parlor cars, and some seasons, sleeping cars were regularly operated from New York City. During the summer season a "Newspaper Special" was operated one round trip on Sundays to furnish passenger service and the New York Sunday newspapers to the various summer colonies. In the early days no passenger cars were carried on this special, a light engine making the round trip, from which bundles of newspapers were thrown at the various stations.

Many special trains and private cars were handled. The most famous, perhaps, among the private cars being the "Oneonta II" of Collis P. Huntington, President of the Southern Pacific Company, who owned a log palace on Raquette Lake called Pine Knot Camp purchased from William West Durant. Here, early in the morning of August 14, 1900, he passed away.

The most notable special train handled probably was the Theodore Roosevelt Special at the time of President McKinley's assassination. At the time Mr. Roosevelt, then Vice President, was on a hunting and fishing trip in the north woods. The writer is indebted to Mr. George W. Brown, Cashier, The Delaware and Hudson Railroad Corporation, North Creek, N. Y. for the following details with respect to this special. The following quotation is from his letter of February 24, 1939 and tells the story:—

"Mr. Walter T. Campbell, now Freight Agent at Mechanicville, N. Y., was Agent at North Creek in 1901. He says that on September 13th, 1901, word was received here by wire that President

McKinley was dying. Several telegrams were received from Secretary Loeb, that were forwarded to Tahawus, asking when Mr. Roosevelt would be at North Creek, and that a special train would await his arrival."

"About 10:00 A. M. on the 13th, this train arrived. It consisted of one coach, one private car and engine No. 130. Engineer George Hydorn. Mr. Campbell does not remember the train crew. However, Edgar A. Hauerwas, now running here says the Conductor was George Chamberlain. Also on the train, in charge, was Superintendent Mr. C. D. Hammond and Mr. Loeb, Roosevelt's Secretary."

"All day they tried to get in touch with Mr. Roosevelt by telephone but was unable to do so, as Tahawus reported him somewhere in the woods. However, about 6:00 P. M. word was received that he had returned to the Club House and would arrange to leave at once. The station was kept open all night awaiting his arrival which occurred about 4:45 A. M. September 14th. He immediately boarded the train, leaving North Creek within five minutes.

"I remember hearing my father (Mr. J. L. Brown) tell that he was busy on the wire all night sending press dispatches that were filed here by newspaper correspondents while waiting for Mr. Roosevelt to arrive."

Engine No. 130 mentioned above was a Delaware & Hudson locomotive, not an Adirondack. George N. Weatherwax was train dispatcher and issued the train orders covering the movement of this special. He was on duty continuously for thirty-six hours.

Another special, run in 1885, is worth more than passing mention. It was ordered by William West Durant, then General Manager of the Adirondack Railway, to take him to the bedside of his father, Dr. Thomas Clark Durant, who was dying at North Creek, N. Y. An account of this run appeared in the DELAWARE & HUDSON BULLETIN of July 1, 1929 which is quoted herein as follows:—

"The trip was being made to carry a Mr. Durant, one of the chief stockholders of the road, to the bedside of his dying father in North Creek. Mr. Durant told him—(Engineer Frank A. Myers)—that he must be in North Creek, fifty-seven miles away, by 9 o'clock; it was 8:03 when the engine backed away from the station at Saratoga. At 8:57 the train stopped at Mr. Durant's gate in North Creek."

The date is not stated in the article from which the above quotation is taken. It was undoubtedly Monday, October 5, 1885 for the record shows Dr. Durant's illness became alarming and he began sinking during the evening of that date, and passed away at 3.37 A. M., Tuesday, October 6, 1885.

The special was operated from Saratoga Springs to North Creek a distance of 57.04 miles and we have the testimony of the late Frank A. Myers, its engineer, that it covered the distance in 54 minutes, an

ADIRONDACK CO'S RAILROAD.

**Saratoga County
AGRICULTURAL FAIR
AT SARATOGA SPRINGS,
September 3d, 4th, 5th, 6th & 7th, 1872.**

Reduction in Fare!

Tickets will be sold for **FARE ONE WAY**, good for Return Passage above dates, if stamped on Grounds of **SARATOGA AGRICULTURAL SOCIETY**.

Full Fare will be charged all who do not procure tickets, except from Stations where there are no Ticket Offices.

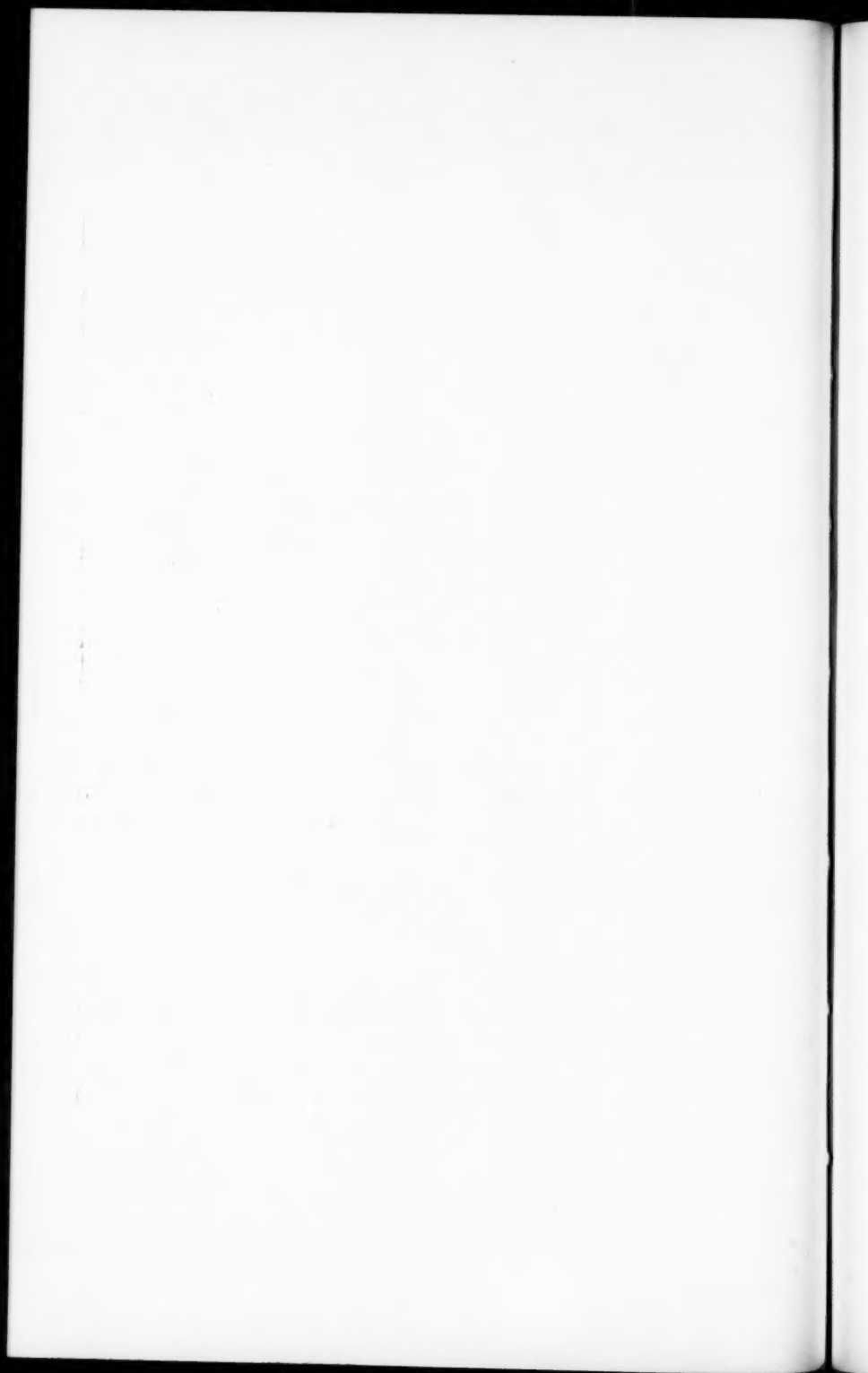
C. E. DURKEE,

Gen. Ticket Agent.

Saratoga Springs, Sept. 3d, 1872.

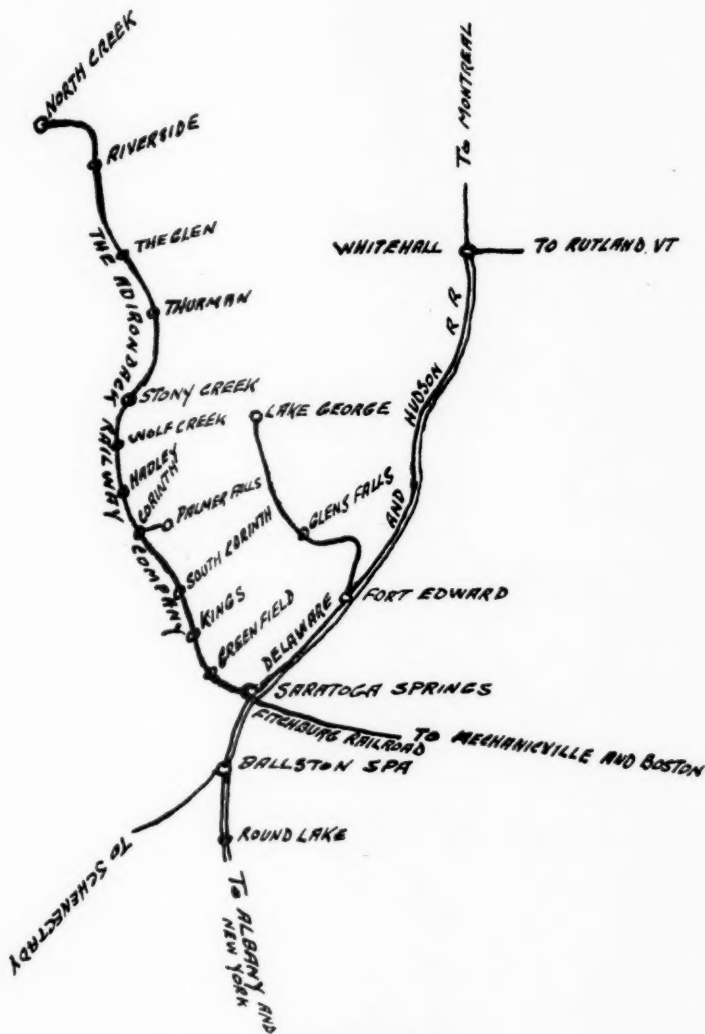
C. H. BALLARD,

Superintendent.

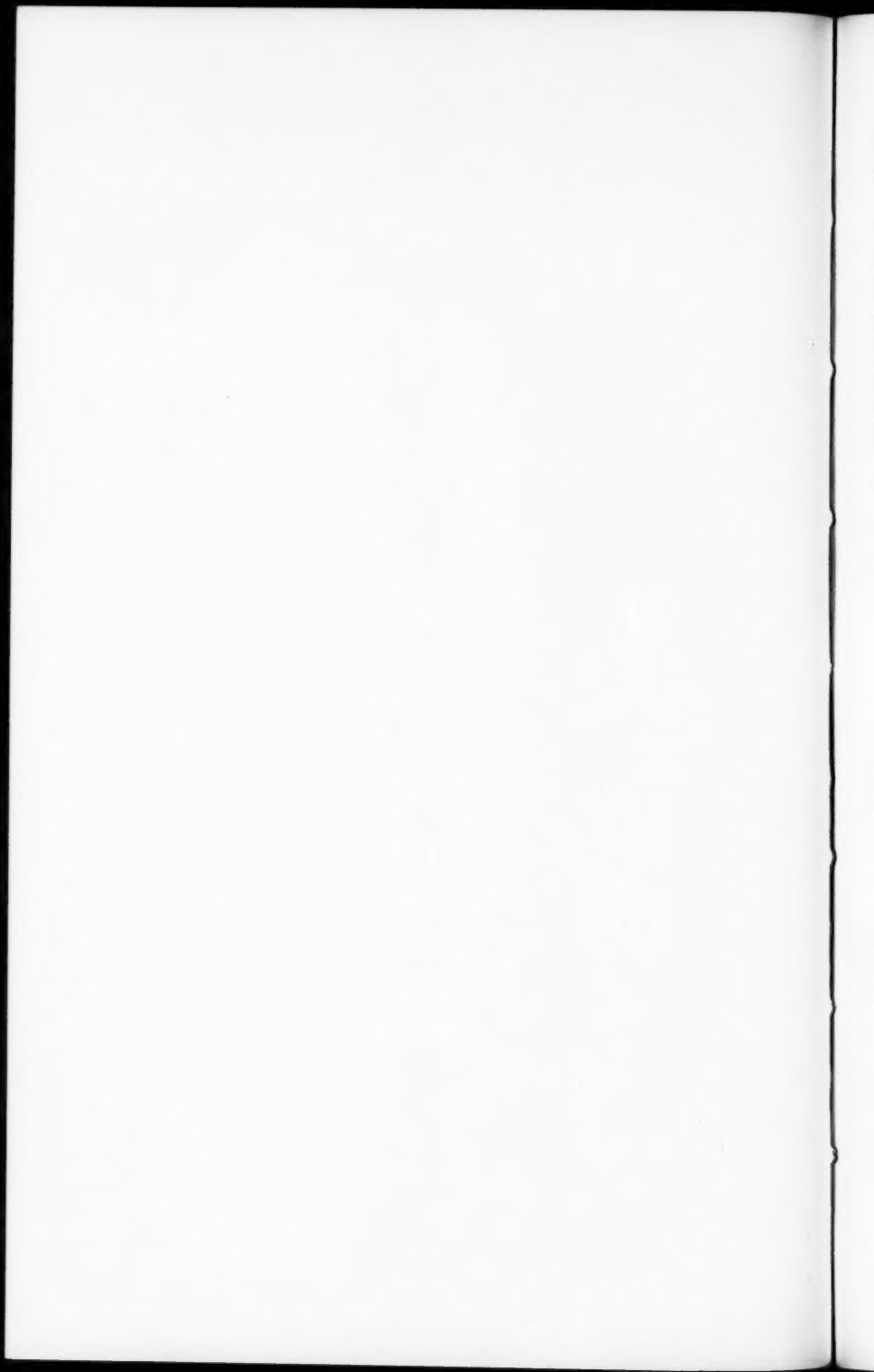


THE ADIRONDACK RAILWAY COMPANY

MAP



Map of Adirondack Ry.



average speed of 63.522 miles per hour. This was truly an amazing performance considering the grades and curves in the line over which the time was made.

Mr. Myer's regular fireman, having already made three round trips without rest, felt he was not physically able to make the trip, and a brakeman volunteered to go in his place. An effort to establish the identity of this volunteer and the number of the engine have been unsuccessful. For the purpose of the record, the writer will state that in a personal interview with Mr. George Myers, brother of Frank A. Myers, the former stated that while he could not remember positively, he believed the locomotive was the road's first coal burner the "Uto-wana," No. 4, as that locomotive was regularly assigned to his brother about that time. This locomotive was a Schenectady 4-4-0 with 64" drivers and 17"x24" cylinders, 145 lbs. boiler pressure, equipped with air brakes and had been in service only a little over a year.

Efforts to establish the identity of the train crew have been unsuccessful.

This was undoubtedly the fastest time ever made on the Adirondack Railway.

The average scheduled speed of passenger trains making nine to ten stops between terminals, was in

1875	— Woodburning locomotives	— 20.53 miles per hour.
1890	— Coalburning locomotives	— 24.68 miles per hour.
1902	— Coalburning locomotives	— 30.00 miles per hour.
The average scheduled speed of passenger trains between stations.		
1875	— Woodburning locomotives	— 24.946 miles per hour.
1890	— Coalburning locomotives	— 31.350 miles per hour.
1902	— Coalburning locomotives	— 40.466 miles per hour.

The writer has been unable to locate any original company records with respect to passenger traffic. The following statistics have been taken from Poors Manual of Railroads for the years indicated which will give some idea of this class of traffic:—

	Number	Passenger	Revenue		
	Passengers Carried	Train Miles	Passenger Train		Total
			Passenger	Mail Express, etc.	
September 30, 1872	30,012	*71,936	\$31,871.80	\$ —	\$31,871.80
September 30, 1882	32,999	45,964	\$36,991.29	\$8,884.47	\$45,875.76
June 30, 1892	66,076	78,194	\$47,396.32	\$6,992.73	\$54,389.05
June 30, 1901	80,576	84,788	\$53,924.32	\$8,303.20	\$62,227.52

* Mixed train mileage.

In 1902, the last year of operation as a separate property, the summer passenger schedule provided for three round trips, daily except Sundays, and one round trip on Sundays only.

The subject of passenger train speed in the days of wood-burning locomotives was discussed by the writer with Mr. George Myers, retired Adirondack and Delaware and Hudson engineer. Mr. Myer's experience

as an engineer dates back to the wood-burning days. He said that speed in the early days was limited not so much by the locomotives, but rather by the limitation imposed by the track and roadbed of the period, as well as the lack of adequate braking power, until the advent of the air-brake. He was of the opinion that with modern track and roadbed a wood-burning locomotive of the 1870's and 1880's, in good mechanical condition, could undoubtedly attain a speed of 65 or 70 miles per hour. He declared it was not unusual to make scheduled running time, in those days, with a three car passenger train on a half open throttle.

SHOP TALK

Said the Engine, "I drink only water and still
I could get on a TOOT if required.
I can TENDER my own resignation at will,
But I can never go till I'm FIRED.

"I get hot when I'm COALED; I never can shirk,
Nor be SWITCHED from my purpose so active.
I RAIL not at fate; but I PUFF my own work,
And es-STEAM it as something at-TRACK-tive

"I have only one eye, which may seem rather queer,
Till you think, if you haven't already,
That engines like I am have only one ear —
The engineer sober and steady.

"My train rushes on like an arrow, swift sped,
Till I put on the brakes and I slack her;
I 'chew, chew' whenever I coax her ahead,
And, likewise, I 'chew, chew' to back 'er."

Waterman.

Richmond and Alleghany Railroad

BY LAURA E. ARMITAGE

Incorporated in 1878 and beginning construction in 1880, the Richmond and Alleghany Railroad Company built 230.31 miles of road from Richmond to Clifton Forge, Va., with a branch line of 19.38 miles to Lexington, Va., total 249.69 miles. Its career as a company, 1878-1890, was brief. During this interval it entered receivership in 1883; was reorganized in 1887 sold at public auction 1889. It emerged as the Richmond and Alleghany Railway Company and from May 20, 1889 to January 20, 1890, was operated by the Chesapeake and Ohio Railway, on which latter date it became Chesapeake and Ohio property.

Previous to the incorporation of the Richmond and Alleghany, two railroads had been chartered to build up the James River valley from Richmond. The first was the Richmond and Lynchburg, on March 30, 1860, of which there are no records. The second, the Straight-Shoot Railroad Company, incorporated March 27, 1873, constructed no line of road. Apparently a number of Richmond's outstanding business men were interested in these former enterprises. On February 28, 1878, an act was approved "to amend the charter of the Straight-Shoot Railroad Company, to change its name to the Richmond and Alleghany Railroad Company, and to extend its limits."

Pioneer ancestor of the Richmond and Alleghany was the James River Company which constructed canal and turnpike improvements, with George Washington as its first president from August 21, 1785 to October 5, 1795, although he was not active.

It was George Washington, who in 1784, initiated the movement to incorporate the canal company when he wrote to Governor Benjamin Harrison of Virginia advocating communication "with the invaluable and extensive country back of us by one or both of the rivers of this State which have their sources in the *Apalachian* mountains." The result was that on December 15 of the same year, it was ordered in the Virginia house that leave be given to bring in a bill for opening and extending the navigation of James River. James Madison was chairman of the committee to prepare and present the bill. On January 5, 1785, John Tyler, father of the tenth president of the United States, signed the enrolled bill for "clearing and improving the navigation of James River," and also "an act for vesting in George Washington, Esq., a certain interest in the companies established for opening and extending the navigation of Potomac and James Rivers." This "interest" was one hundred shares of James River Company stock which Washington and Lee University eventually inherited.

Successor to the James River Company was the James River and Kanawha Company, incorporated March 16, 1832, and organized May 25, 1835. Works of these two companies included a canal, completed from Richmond to Buchanan, Va., 196.50 miles; a turnpike from Covington, Va., to the Ohio River and improvements of the Kanawha River from above Charleston to Point Pleasant, Ohio. Difficulties

delayed the project and time intervened. In the meanwhile transportation via railroads proved its superiority and by 1873, the Chesapeake and Ohio, paralleling the canal right-of-way from Covington westward, was operating over the Appalachian mountains. George Washington's dream was fulfilled of communication between the east and the west, through the territory he advocated, but not by canal.

The properties of the James River and Kanawha Company were acquired by the Richmond and Alleghany by deed on March 4, 1880, and that of the Buchanan and Clifton Forge Railway, a kindred company, with the same officials, on July 2, 1880.

The Buchanan and Clifton Forge Railroad Company, incorporated March 20, 1875, on March 27, 1876, changed its name to the Buchanan and Clifton Forge Railway, with certain provisions of the former act modified. It was authorized in order to complete transportation facilities from Buchanan to Clifton Forge, Va., and to Lexington, Va., the canal having failed to make headway. This road, built on company account with convict labor, was not completed. During construction Chief Engineer William Jolliffe reported that on June 29, 1877, he learned "that Mr. H. C. Parsons, acting in the name of the Straight Shoot railroad company, had begun work on the bluff opposite Clifton Forge and on our location An amicable adjustment was had with Mr. Parsons and we were allowed to progress with our work without further trouble from any one."

Reorganization of Richmond and Alleghany

The above referred to gentleman, Colonel H. C. Parsons, a native of Vermont had commanded a regiment of Federal cavalry during the War Between the States, subsequently becoming a citizen of Putnam County, W. Va. Later he moved to Richmond, Va., to become a pioneer leader in organizing the Richmond and Alleghany. He had been a director of the Chesapeake and Ohio on Collis P. Huntington's first board in 1868 and continued in that capacity until C&O receivership in 1875.

Colonel Parsons was an enthusiastic advocate of the utilization of the advantages offered by the James River route for a railroad and so bent his energies to its accomplishment. Among other substantial men he enlisted in the enterprise was Francis O. French, of the First National Bank of New York, whose influence later dominated the movement. Through Colonel Parsons the rights of the people interested in the Straight Shoot Railroad were acquired.

During organization of the Richmond and Alleghany, George M. Bartholomew, of Hartford, Conn., was nominal president. He was soon succeeded by Francis O. French, with H. C. Parsons, Vice President; Eugene R. Leland, secretary; Sheppard Homans, treasurer. General offices were at No. 2, Wall Street, N. Y.

Directors of the new line in 1880-1881 were: William H. Barnum, Lime Rock, Conn.; Francis O. French, New York; George M. Bartholomew; Joseph H. Gray, Boston, Mass.; Hugh McCulloch, Washing-

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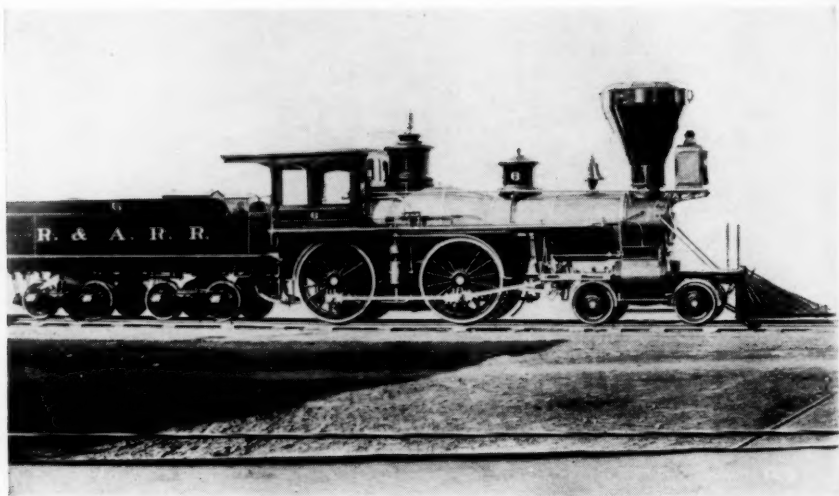
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Courtesy of Ry. & Loco. Hist. Soc.
Richmond & Allegheny R. R. #6. Grant 1880. Cylinders 15x24", DD 60".

ton, D. C.; Cyrus H. McCormick, Chicago, Ill.; John J. McCook, New York; Henry C. Parsons, Richmond, Va.; William L. Scott, Erie, Pa.; Samuel Shethar, New York; John W. Simpson, New York; Henry D. Whitecomb, Richmond, Va.; Charles E. Wortham, Richmond.

Mr. Parsons resigned as vice president and director in December, 1881. He had accepted the presidency of the Atlantic and North-western Railroad of West Virginia, (Minutes).

Henry D. Whitecomb, director from Richmond, Va., was later to be chief engineer of the Richmond and Alleghany. He had been chief engineer and general superintendent of transportation of the Virginia Central Railroad and of its successor, the Chesapeake and Ohio Railroad until after construction was completed by that road to the Ohio in 1873.

Synopses of Acts Regarding Richmond and Alleghany

Richmond and Alleghany's charter stated that construction between Richmond and Lynchburg should begin within two years and be completed within four years, with the section between Lynchburg and Buchanan and the branch to Lexington to be commenced within ninety days and completed twelve months from the date of contract with the James River and Kanawha Company for the use of the intermediate works.

The main line of the railroad was to be from Richmond to Lynchburg to any point on the Chesapeake and Ohio west of Staunton and it and branches might extend to any point or points on the West Virginia State line, via Craig's Creek or Jackson's River or any other tributary of James River, and it might build a branch to Lexington and one to Fincastle. But it should not interfere with the franchises or privileges of the James River and Kanawha Company or of the Buchanan and Clifton Forge Railway Company.

When, in 1880, the James River and Kanawha Company was authorized to sell its works, property and franchises to the Richmond and Alleghany, the contract of sale contained the following provisions:

Business on the canal not to be interrupted during railroad construction . . . Construction and equipment of a first class railroad, using steel rails; same gauge as Chesapeake and Ohio; to be built within time limited in act . . . Assumption and payment of all debts and obligations of the James River and Kanawha Company; debt of State to be superior to other mortgages . . . Sum of money not less than \$30,000 nor more than \$50,000 to be paid by railroad company in cash for salaries and expenses up to time of transfer and in other expenses since May 1, 1867 . . . Railroad Company to deposit with Virginia Board of Public Works \$500,000 market value of United States bonds as a pledge for the completion of the road within twenty months; Fifty thousand dollars in value of said bonds to be surrendered to the railroad company when a section of twenty-five miles completed. On completion of whole remaining bonds to be delivered . . . Fifty miles below Lynchburg and fifty-six miles above Lynchburg to be completed in ten months from date of sale . . . If the canal from

Columbia to the first locks above Stillman's Mills on Rivenna River shall be discontinued, a branch line shall be built along this route . . . Contract existing shall be respected and maintained at rates not exceeding the present rates . . . Water supply at stipulated places to be maintained and during construction the present water supply shall not be destroyed nor lessened . . . Railway Company to maintain farm bridges over bed of canal . . . Railway Company may arrange for temporary use, not exceeding three years, in passing through Lynchburg of any tracks already constructed . . . All railroad property to be subject to taxation . . . Have no right to build new dams in James River. May charge rent for water . . . Railroad to pay owners of all boats on the canal fair value not to exceed \$25,000 in the aggregate . . . Shall furnish facilities to people on south side of river traveling or shipping on railroad, equal to those afforded by canal company . . . Required to provide suitable sluices, slopes or fish ladders at dams . . . Cannot renew Canal Company's contract with State for convict labor . . . Required to drain canal when abandoned and drain it so as to leave no stagnant water.

Cost of Acquisition

President French reported on September 30, 1881: "The Richmond and Alleghany Railroad Company acquired the properties, works and franchises of the James River and Kanawha Company and the Buchanan and Clifton Forge Railway Company at a cost in stock and cash of \$6,389,511.93, thus securing the legal right-of-way for its railway lines, basin and docks in Richmond, and other property including liens of \$1,537,381.42.

"The company acquired further rights-of-way needed by improved location at a further cost in cash of \$199,097.83, making a total of \$6,588,609.76. These disbursements have been arbitrarily distributed among Richmond Dock property valued at \$1,000,000 and Rights of Way franchises, \$5,588,609.76."

Of the above amount \$138,525.73 was paid for debts and obligations of the Buchanan and Clifton Forge Railway Company.

Construction

Work on the railroad was begun at Richmond and also at Clifton Forge within the time limit. General Manager Decatur Axtell, who was later vice president of the Chesapeake and Ohio, reported for 1880-1881: "The end of the fiscal year preceded but a few days the 'driving of the last spike.'" The main stem, Richmond to Williamsons (Clifton Forge) was completed September 12, 1881, with arrangement for temporary use of track of Virginia Midland through Lynchburg as authorized by statute. The branch to Lexington was completed October 14, 1881.

As construction advanced the sections were opened for operation, as

follows: From Richmond westward:

Cedar Point	32.50 miles	Oct. 18, 1880
Pemberton	46.50 miles	Nov. 4, 1880
Columbia	56.50 miles	Nov. 19, 1880
Bremo Bluff	66.50 miles	Feb. 17, 1881
Scottsville	79 miles	March 17, 1881
Howardsville	90.50 miles	April 8, 1881
Norwood	106 miles	May 2, 1881
Joshua Falls	134 miles	June 18, 1881
Lynchburg	146 miles	Aug. 18, 1881

From Clifton Forge eastward:

Buchanan	35 miles	Jan. 29, 1881
Indian Rock	41.50 miles	March 28, 1881
North River	56 miles	April 13, 1881
Lynchburg	83.50 miles	Sept. 21, 1881

Formal opening of the road took place under the auspices of the Board of Public Works officially on October 15, 1881, in the presence of passengers brought to Howardsville by special train from Richmond, Clifton Forge and Lexington. It was a happy occasion for the inhabitants of this section of the country. The final instalment of the U. S. bonds deposited as a pledge for fulfillment of statutory contract, of March 5, 1880, was delivered to the company on the day of the celebration.

Statutory period for completion of fifty miles west from Richmond and fifty-six miles from Williamsons (Clifton Forge) to North River, in all 106 miles, was July 5, 1881. The date set for completion of the whole line was November 5, 1881; this was accomplished by October 15, 1881.

Use of the Towpath in Track Laying

"Excepting along Maiden's Adventure pond, Tye River and about a mile on the south side of the James near Joshua Falls bridge, the track was everywhere laid upon the towpath between Richmond and Lynchburg. It has since been removed in several places where the curvature was excessive and placed upon unobjectionable alignment. Between Lynchburg and Buchanan and Lexington newly-graded roadbed is almost continuous and is nearly everywhere higher than the towpath. From Buchanan to Williamsons the road was built upon the unfinished work of the Buchanan and Clifton Forge Railway," General Manager Axtell reported as of Sept., 1881. Later in writing of this feature, the towpath, Mr. Axtell said: "It was supposed by many people that the construction consisted merely of laying the track on the towpath. Owing to its sharp bends the towpath could not be used in many places between Richmond and Lynchburg and new roadbed had to be constructed, while the towpath was used for the railroad on only a small portion

of the line between Lynchburg and Clifton Forge. An almost wholly new construction was found to be necessary on that part of the road. This involved unexpected cost and was a disappointment to most of those interested in the project. It was, however, only a continuation of chronic experiences of unexpected cost that had for a long period of years attended the construction of the James River improvement and had been met with by Mr. Huntington in building the Chesapeake and Ohio from Covington westward."

Other structures erected were: a telegraph line the entire length of the road, with offices ten miles apart: a telephone line from Richmond to Lorraine and extended by the Henrico Coal Mining Company (eleven miles) to mines. At Richmond a commodious freight building with necessary track in 1881 was under construction in the basin. A timber trestle, extending from Tenth Street to Nineteenth, upon property owned by the company, was decided upon, with an agreement with the Richmond and Danville allowing spanning of their property with two iron bridges resting on three masonry piers. At Richmond a brick roundhouse, of seven stalls and a small brick blacksmith shop and repair shop were built, as well as a four stall roundhouse at Iron Gate, (near Clifton Forge).

Total length of the Richmond and Alleghany, 249.69 miles, plus 1.24 miles of Dock connection, had an influencing shipping feature. There were no grades of moment ascending eastwards, the heaviest being forty-seven feet per mile for a short distance on the permanent track in Lynchburg. The only grades affecting the movement of west-bound freight traffic occurred at the canal locks in overcoming the rise of a few feet at these places. This characteristic was the deciding factor for purchase of the Richmond and Alleghany by Chesapeake and Ohio.

Additional Construction in Lynchburg

On the opening of the Richmond and Alleghany in 1881, in addition to the extension to tidewater at the dock in Richmond, there remained location of the permanent track in Lynchburg, as a task to be done.

According to Mr. Axtell, "Lynchburg presented a unique and serious physical problem. The narrow strip of bottom land between the river and the foot of the steep hillside on which this portion of the city was built, was completely occupied by the bed of the canal, the tracks of the Norfolk and Western and the Virginia Midland railroads and warehouses, filling the space to the water edge on each side. The attitude of both these railroads was hostile. Virginia Midland stated it would refuse to renew the contract for use of its tracks. The canal had to be maintained by terms of the charter. Norfolk and Western refused to allow a track crossing to be put in."

In this dilemma it occurred to General Manager Axtell that it might be possible to utilize the bed of the canal in passing by and through all these complications. He states, "The engineering staff pronounced this impracticable but upon careful survey it was found that by sinking a track in a trench fourteen feet wide in the water on the south side of

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Richmond & Allegheny R. R. #18. Grant 1881. Cylinders 17x24". DD 56".
Courtesy of Ry. & Loco. Hist. Soc.

the canal bed, and protecting the trench by sheet piling made water tight, the track could be depressed sufficiently to allow it to pass under the side of the south arch carrying Ninth Street over the canal and also by carrying the sunken track further on in the canal and through the aqueduct over Blackwater creek, and still on with the scantiest head room under the Norfolk and Western bridge over the creek, it could then emerge and by a stiff ascent the track could rise from its bed in the canal to its normal grade."

This successful arrangement, built in 1882, brought a change of heart in the competing railroads and in November, 1887, a permanent line was put through Lynchburg and the sunken track removed.

Equipment

	1881	1884	1888
Sleeping cars	1	3	3
Passenger cars	16	16	16
Passenger Ob. cars	—	2	2
Baggage cars	7	10	10
Box cars	193	273	256
Stock cars	—	48	46
Flat cars	235	412	286
Gondola cars	—	12	129
Coal cars	21	50	52
Service cars	—	3	19
Caboose cars	8	10	9
	<hr/> 481	<hr/> 839	<hr/> 828
Locomotives	11	19	22

The cars were all of 40,000 lb. capacity excepting 35 box cars and 39 flat cars bought in 1881 of 20,000 lbs. capacity, afterwards rebuilt and increased to 40,000 lbs. Steel rail, 56 lbs. to the yard, made by Bethlehem Steel Company, substantial bridges and roadbeds made these cars, just then coming into use, practicable.

Locomotives

As of September 30, 1881, R & A locomotives were: "All 8 wheels."

#	Cy.Di.	St.	Dr.Wh.	Wt.	Fuel	Date rec.	Builders
1	13 in.	22 in.	5 ft.		wood	9/ 1/1880	Danforth, Cooke & Co. (second hand)
2	13 in.	22 in.	5 ft.		wood	9/ 2/1880	ditto
3	17 in.	24 in.	5 ft.	70,000	*coal	9/ 7/1880	Grant Loco. Wks.
4	17 in.	24 in.	5 ft.	70,000	*coal	1/ 6/1881	Grant Loco. Wks.
5	15 in.	24 in.	5 ft.	60,000	wood	11/15/1880	Grant Loco. Wks.
6	15 in.	24 in.	5 ft.	60,000	wood	11/22/1880	Grant Loco. Wks.
7	17 in.	24 in.	5 ft.	70,000	wood	1/ 6/1881	Grant Loco. Wks.
8	17 in.	24 in.	5 ft.	70,000	*coal	1/24/1881	Grant Loco. Wks.
9	17 in.	24 in.	5 ft.	70,000	coal	1/24/1881	Grant Loco. Wks.
10	17 in.	24 in.	5 ft.	70,000	coal	7/10/1881	Grant Loco. Wks.
11	17 in.	24 in.	5 ft.	70,000	coal	7/10/1881	Grant Loco. Wks.

* Nos. 3, 4 and 8 were wood-burners when received but changed to burn coal.

By 1888 the first two locomotives bought second hand, built by Danforth and Cooke, had been discarded. The additional thirteen bought, (making a total of 22) were all from Grant Locomotive Works and were added to the road in the following years: Nos. 12 to 18, in Oct. 1881; Nos. 19 and 20 in Feb. 1882; No. 21 in March 1882; Nos. 22 through 24 in Sept. 1887.

After sale of R&A to the C&O these locomotives were gradually transferred to C&O branch line service.

Effort Toward Western Extension

As granted by the charter, the Richmond and Alleghany in 1881 attempted to establish western extension. Says President French in the Annual Report, "A contract was entered into with the Ohio Central Railroad Company of Ohio, the Atlantic and Northwestern Railroad Company of West Virginia and this Company for the consolidation of the three companies." The projected route of the extension was from Eagle Rock, seventeen miles west of Buchanan, following the valley of Craig's Creek and by tunnel to one mile of the valley of Sinking Creek, a tributary of New River—the length of the entire consolidation, 800 miles. The new railroad was to be called the Richmond, Alleghany and Ohio Central Railroad Company. For a while stockholders were enthusiastic, financing and locating were doing well. Then came the business and money crash of 1883, and the project expired.

Receivership

Despite efforts of management to increase earnings to an amount sufficient to meet capital and operating expenses, early in 1883 application was made for the appointment of a receiver. On June 23, 1883, Lawrence Myers of Plainfield, N. J., and Decatur Axtell, of Richmond, took control of the properties. James T. Closson succeeded Francis O. French as president in 1883-1884. In 1888 Mr. Myers resigned as receiver, Mr. Axtell remaining.

Difficulties due to yearly freshets on the James River, occasionally disastrous, increased maintenance charges. The receivers, however, operated the road in good order, adding to its structures.

Buchingham Branch

At New Canton, Va., before the receivership, a branch railroad to the slate quarries, about four miles away, had been contemplated. This was put in operation in the summer of 1885 and the road leased to the R&A for 40 years from January 1, 1885.

Reorganization Committee

Following the appointment of receivers and the default in payment of interest on the first mortgage bonds a committee was appointed, representing all holders of second mortgages, about one-half of the outstanding first mortgage bonds and a large proportion of the common

stock, composed of Erwin Davis, Chairman, James B. Colgate, John J. McCook, James T. Closson, George F. Baker, Francis O. French and Smith Clift.

Another committee consisting of George Buckham, James Baker and John C. Barron representing certain holders of first mortgage amounting to about one-fourth of the entire issue.

In 1887 the relations between these two committees, which had been strained, became more friendly and they merged to become the recognized reorganization committee, the membership being, Erwin Davis, chairman, George F. Baker, Smith Clift, James T. Closson, Charles F. Cox, Francis O. French, John J. McCook and J. Kennedy Tod.

Decatur Axtell said, in speaking of these committees: "The feeling that holders of first mortgage bonds would not receive fair treatment at the hands of the committee representing about one-fourth of the first mortgage bonds, attracted to the new committee some prominent holders of first mortgage bonds among whom was Mr. W. K. Vanderbilt who held \$500,000 of these bonds. Mr. Vanderbilt designated Charles F. Cox, treasurer and later president of the Canada Southern Railway, to look after his interests in the R&A bonds. Mr. Cox recognized the futility of strife and sought and obtained a place on the special committee which he soon reorganized and thereafter influenced and dominated until eventually a merger took place. Mr. Cox became a member of the purchasing committee and upon organization of the Richmond and Alleghany Railway Company, was made its vice president. He was active in the proceedings resulting finally in the conveyance of the R&A to the Chesapeake and Ohio. In the course of his connection with the R&A he had studied the conditions of the Chesapeake and Ohio, saw its resources of coal, iron, timber from vast forests, undeveloped natural wealth and splendid capabilities as a great transportation route. He became impressed with the great value this route would be to the Cleveland, Cincinnati, Chicago and St. Louis Railway and through his reports Mr. Vanderbilt became better acquainted and impressed also, and, with Mr. J. P. Morgan, who was associated with him in the ownership and control of that railway, the Big Four System, it was determined to purchase from Collis P. Huntington a large part of his controlling interest in the capital stock of the Chesapeake and Ohio.

An agreement was entered into by the R&A and C&O on April 1, 1888, which stipulated that "the two railroads should be operated in a common interest and under a common management until in the opinion of counsel the R&A and property of all kinds can be transferred to the C&O Railway . . . After January 1, 1889, the C&O would put upon the R&A an average tonnage of 250,000 tons of through business . . ."

Richmond and Alleghany was sold at public auction on April 16, 1889 to Erwin Davis, Charles F. Cox and J. Kennedy Tod, a sub-committee of the R&A. On May 20, 1889 this committee became a corporation under the title of Richmond and Alleghany Railway Company and a formal conveyance of the property made to them. Control

and management of the railroad was turned over to C&O on May 20, 1889 and final deed of conveyance of the franchise and property of the R&A made to the Chesapeake and Ohio on January 20, 1890.

At this time M. E. Ingalls was president of the C&O. The road extended from Newport News, Va., to Cincinnati, O., approximately 663 miles. Although the Richmond and Alleghany was 38 miles longer from its western terminus to Clifton Forge where it connected with C&O, to Richmond, its grades made for better operation. No longer would the heavy freights of the C&O have to pull over the difficult grades of the Blue Ridge mountains.

Chronology of Events Leading Up to Advent of Eastern Capital Into the Aurora Branch Railroad, Its Change of Name to Chicago and Aurora Railroad, and Passing of Local Control to That of Eastern Financial Interests

BY A. W. NEWTON

March 26, 1850, the directors of the Aurora Branch Railroad planned extension of that line westward, and on this date "Resolved, that it is the desire of the Directors to extend the Aurora Branch Railroad to the most feasible point on the Illinois River, as soon as possible." At this time it was planned and surveys were made down the Fox River Valley, for a line terminating at or near the town of La Salle, on the Illinois River, at which point the proposed Illinois Central line would cross same.

February 15, 1851, Mr. Elisha J. Wadsworth was elected president of the Aurora Branch Railroad, which had been completed and in successful operation since September 1850.

July 15, 1851, the board of directors of the Aurora Branch Railroad, "Resolved, that Capital stock of this company be and is hereby increased to the sum of six hundred thousand dollars." Prior to this date the capital stock was one hundred thousand dollars, of which only about one-half had been sold. At this meeting the directors again "Resolved, that the Board deems it expedient to construct such other route or routes as may be found necessary to connect this road with the Galena Branch of the Illinois Central Railroad."

November 17, 1851 and December 16, 1851, Mr. Wadsworth attended directors meetings at Aurora, Illinois.

February 7, 1852 and February 20 to 23, 1852, he was, likewise in attendance at stockholders and directors meetings in Aurora, Illinois.

February 22, 1852, at the annual stockholders meeting in Aurora, Mr. James W. Brooks, of Detroit, was elected a director of the road, at which Mr. Wadsworth was present.

The election of Mr. Brooks, one of Mr. Forbes' Western Associates on this date is the first indication of entrance of eastern capital in the financial structure of the Aurora Branch Railroad which on June 22, 1852 became the Chicago and Aurora Railroad, and on February 21, 1855, became the Chicago, Burlington and Quincy Railroad.

To me, the election of Mr. Brooks on February 22, 1852, clearly establishes the date of the Boston meeting as occurring prior to Mr. Brooks' election, and in fact prior to February 7, 1852, because Mr.

Wadsworth was in attendance at a board meeting in Aurora on this date, and again on February 20, 1852. The intervening time between February 7 and February 20 would not have been sufficient for a trip from Chicago to New York and Boston and return—under wintry weather conditions and with limited means of transportation then available. It seems, therefore, that between the first of the year and February 7 lies the date of that meeting. It also seems certain that the meeting did not occur subsequent to February 22, for its necessity did not then exist, since eastern capital was already enlisted in the Aurora Branch Railroad.

The "cast" of players in this drama leading up to the formation of the Chicago, Burlington and Quincy Railroad Company, February 21, 1855, is not only interesting, but really informative.

Elisha J. Wadsworth was a successful merchant in Chicago, who became interested in the organization of the Aurora Branch Railroad, was one of its first directors (1849) and its president from February, 1851, to February, 1852. Like most business men in those days, he knew little of the problems of financing and construction of railroads but had faith in their necessity and eventual success. He realized the need of interesting outside capital in the road if it were to be extended westward, that virgin territory might be developed and from it come revenue to the road. He, doubtless, visualized the benefits that would accrue to the Michigan Central Railroad, with the Aurora Branch Railroad as a feeder, and therefore in *the Spring* of 1852 went to Boston to interest the owners of the Michigan Central in its extension westward from Aurora.

Chauncey S. Colton was a merchant in Galesburg, Illinois, who, with others projected a road north eastwardly from Galesburg to connect with a railroad (the Chicago and Rock Island Railroad) leading to Chicago. He, like Mr. Wadsworth, was dealing with problems entirely new to himself; and soon, with his associates, found themselves in financial difficulties, which led him to go to New York and finally to Boston to interest eastern capital, so that the road (Central Military Tract Railroad) might be carried to completion.

James W. Grimes, a lawyer in Burlington, Iowa, and later Governor of that state, had become interested in a projected railroad from Peoria, Illinois, to the Mississippi River, known as the Peoria and Oquawka Railroad. Not being sufficiently financed, this road had by 1851 used up all funds obtained through local sources, and construction work was at a standstill. So in *the spring* of 1852 Mr. Grimes went to Boston for the purpose of enlisting eastern capital.

So we have three western men, each arriving in Boston at the same time, in quest of funds to bring to completion three railroads, all of which were in such financial straits, that their completion hinged on the securing of additional funds which could not be raised except through other than local sources. It is a strange coincidence that these three men, on similar missions should meet in Boston, but there seems to be no doubt that such a meeting did occur.

Now for a brief picture of the eastern capitalists who became interested in and finally came into complete control of these various projects which were the nucleus from which the Burlington System grew.

John Murray Forbes, a resident of Boston, who, through various commercial activities, had amassed a fortune, retired from these activities, and established a "counting house" thus entering the financial field. He was a man of great vision, and high ideals, coupled with extreme sagacity, placing his money, with that of his associates, in projects, which investigation seemed to him to promise reasonable returns on the invested capital. He, likewise, restricted his investments to projects which he could be sure of absolute control, as to development and operation, as well as financing. In 1846 he was attracted to railroad development in the Middle West, which eventually led him to interest himself in what later was to be the great Burlington System.

Although the railroad era was then less than twenty years old, he was living among those who knew most about its problems, and when in 1846 he acquired the Michigan Central Railroad from the State of Michigan, he enlisted the services of Daniel Webster, because of his legal knowledge and experience with eastern roads, to draft the charter under which he would take over that road.

John Woods Brooks was Mr. Forbes western representative and located at Detroit, Michigan. He was an Engineer and also experienced in railroad operation. He was a New Englander, educated in Boston; was Chief Engineer of the Boston and Maine Railroad in 1839; and later Superintendent of the Auburn and Rochester Railroad; from that road he went to Detroit in 1845. In the winter of 1845-6 he met Mr. Forbes to whom he presented a plan for acquisition of the Michigan Central Railroad. From this meeting resulted an alliance and friendship that continued until Mr. Brooks' death in 1881. During these years, the confidence of Mr. Forbes in the ability of Mr. Brooks was shown by the many positions of trust and responsibility placed upon him.

James F. Joy, a native of New Hampshire studied law in Harvard University, admitted to the bar in 1836, and went to Detroit, where he formed the law firm of Joy & Porter. In 1846 he became identified with the Michigan Central Railroad, and specialized in law pertaining to railroad affairs—particularly in Indiana and Illinois where he had much to do with development and enactment of railroad laws in those states. In 1846, he with James W. Brooks, became the western representatives of Mr. Forbes—shaping the legal, engineering, operating, and administration policies for the Michigan Central Railroad, which Mr. Forbes and his associates had just acquired. From 1852 to 1867 he was Solicitor for the Illinois Central Railroad, then building from Cairo, Illinois north to Galena, Illinois, with a spur into Chicago. He became one of the most noted railroad attorneys in the country, and eventually devoted his entire time to railroad work. In 1852, he with Brooks, and others acquired in the Aurora Branch Railroad, and soon after was appointed director of the Chicago and Aurora Railroad, its successor.

From the foregoing historical record, and succeeding events which will be cited, it seems possible to construct a picture leading up to the consolidation of the three roads before mentioned, and the birth of the Chicago, Burlington and Quincy Railroad Company, February 21, 1855. Placing the date of the "meeting in Boston" early in the year 1852—January seems the only month—giving due consideration to the time element; following this the trip to New York, as suggested by Mr. Forbes, to confer with Messrs. Green and Griswold, directors of the Michigan Central Railroad; and then, at their suggestion, the trip to Detroit, Michigan, to confer with Mr. Brooks, at that time chief operating officer of the Michigan Central. That the meeting with Brooks proved favorable is shown by events that followed. According to Mr. Forbes' letter to a New Bedford, Mass., associate, not only Mr. Brooks, but other eastern capitalists, most of them already interested in the Michigan Central Railroad,—subscribed liberally to stock in the Aurora Branch Railroad—over \$100,000 in all—which made the extension west from Aurora possible. This stock subscription must have been made prior to the annual stockholders meeting, February 22, 1852, and which was sufficient to elect Mr. Brooks a director, as well as assuring control of the property.

At the directors meeting on the following day (Feb. 23) it was "Resolved, that in the opinion of the Board, the interests of the company demand the early extension of the road from Aurora to the proposed connection with the Galena Branch of the Illinois Central Railroad, and the Board will take immediate measures to the accomplishing of this object." That *immediate measures* were taken is evidenced by the fact that in May, 1852, the engineer in charge of surveys filed his report with the Board, and the committee on final location, July 16, submitted its report fixing the western terminus of *the extension* at Mendota, Illinois.

In the meantime, under the direction of Mr. Joy, the necessary legislation authorizing *the extension*, and at the same time the change of the name of the road from Aurora Branch Railroad to the Chicago and Aurora Railroad was enacted. The Act was passed June 22, 1852, during the second session of the Illinois Legislature, which convened on June 7. It is an interesting fact that at this second session of the Legislature, amendments to existing Acts for four different railroads were passed, all within a period of four days. For the Central Military Tract Railroad June 19; for the Northern Cross Railroad June 21; for the Aurora Branch Railroad June 22; and for the Peoria and Oquawka Railroad on the same day. This meant that representatives of the four roads were in Springfield, Illinois, at the same time—and there must have been conferences between them with a view of so amending the existing acts, as to permit of the later consummation of a previously conceived plan of consolidation.

Now as to the various enactments: That pertaining to the Aurora Branch Railroad was to authorize extension of the Branch westward to a connection with the Illinois Central Galena Branch at Mendota,

under the name of the Chicago and Aurora Railroad Company, and also to permit of a connection with the Central Military Tract Railroad, projected from Galesburg eastward to Mendota.

In regard to the Central Military Tract Railroad, the amendment was enacted so as to permit that road to change its route to terminate at Mendota, and there to connect with the extension from Aurora. Also to have the charter so amended that the question of rates would rest in the Railroad, and not be subject to legislative enactments. In other words, a charter similar to that granted the Illinois Central. Mr. Joy, who was then Solicitor for the Illinois Central, and was conversant with its charter, undoubtedly "steered" the Central Military Tract people in the framing of this amendment, so that under same the eastern interests could and would furnish the necessary capital for construction of the line.

The amendment to the Northern Cross Railroad act, was undoubtedly engineered by Mr. Joy, for he had, as Mr. Colton says, insisted upon a change that would terminate this road at Galesburg, and thus avoid the construction of a parallel and competing road east or northeast from Galesburg, to which Mr. Forbes and his associates objected, which resulted in Mr. Colton's going to Quincy, and negotiating an agreement that placed the terminus of the Northern Cross Railroad at a connection with the Central Military Tract at Galesburg. This agreement made necessary the amendment to that road's charter.

And lastly, the amendment to the charter of the Peoria and Oquawka which changed its route so as to pass through Galesburg and terminate at a point on the Mississippi River, opposite Burlington, Iowa, several miles south of Oquawka, in order that financial aid for this line might be assured, and at the same time by locating the line through Galesburg and to a point opposite Burlington, give a continuous and direct route from Chicago to the Mississippi River.

Then with the building of the Northern Cross Railroad from Quincy to a connection with the Central Military Tract Railroad at Galesburg, would result in a second line from Chicago to the Mississippi River at Quincy.

According to Pearson, in "An American Railroad Builder" (page 45) Mr. Forbes visualized in 1851, "the prospects of railroad building in Illinois" when writing to Mr. Russell Sturgis, at that time in London (page 45). Again on page 55, Pearson wrote "thus Forbes busied himself with a comprehensive scheme of railroads for the State of Illinois, and even of lines beyond the Mississippi, at a time when there were not one hundred miles of track west of Chicago."

The only three railroads built or building west of Chicago in 1851 were the Chicago and Galena Union Railroad; the Chicago and Rock Island Railroad; and the Aurora Branch Railroad. If we are to accept Mr. Pearson's "not one hundred miles of track west of Chicago" statement, then Mr. Forbes was well informed and interested in railroad possibilities in Illinois in 1851—possibly in 1850. This was at least a year before the Boston meeting in the spring of 1852. From

records of the roads below listed and from J. L. Ringwalt's "Development of Transportation System in the United States," and Volume IV, U. S. Census of 1880, the following table has been prepared:

Mileage of Railroads in Illinois—West of Chicago
January 1

	1851	1852	1853	1854
Chicago & Galena Union	42.00	78.0	92.0	142.0
Chicago & Rock Island	—	—	40.2	159.0
Aurora Branch	12.0	12.0	12.0	58.0
	<hr/>	<hr/>	<hr/>	<hr/>
Totals	54.0	90.0	144.2	359.0

Based on Pearson's statement, with only 90 miles of track west of Chicago on January 1, 1852, it seems evident that Mr. Forbes was considering entering the field of railroad development in Illinois prior to January 1, 1852.

In regard to Mr. Forbes busying himself with possible "lines beyond the Mississippi"—it is well to note that the Hannibal and St. Joseph Railroad which had been incorporated Feb. 16, 1847, was organized Jan. 8, 1851, and construction began at once from Hannibal west. Here then was an opportunity which he saw for one line across Northern Missouri, and must have had this in mind when he decided upon financial aid for the Northern Cross—Quincy to Galesburg line. Another line, the Burlington and Missouri River Railroad extending westward across Iowa, from Burlington to the Missouri River, incorporated January 15, 1852, was under construction in May of that year. These roads he saw as feeders to the lines in Illinois he was preparing to or had financed, and through them an outlet to the east over his Michigan Central Railroad.

In those days, Poor's "American Railroad Journal," issued weekly, contained items quoted from papers over the country pertaining to railroads, railroad legislation and projects. With his keen interest in railroads this publication must have been of special interest to Mr. Forbes and one source of information upon which he relied to keep in touch with the rapidly, (too rapidly, he thought) expanding railroad development, particularly in the middle west, where his great interests centered.

It must be remembered that practically all of the events cited in the preceding pages occurred in the eleven months from July 15, 1851 when the capital stock of the Aurora Branch Railroad Company was increased from \$100,000 to \$600,000, and June 22, 1852, when by act of the Illinois Legislature, the name of the road was changed to the Chicago and Aurora Railroad Company, and authority given for extension of the road westward to Mendota, Illinois; and that the most important of them occurred between February 22, 1852, when eastern capital gained financial control of the property, and elected Mr. Brooks a director, and June 22, 1852, when the name of the road was changed. The preceding

pages may therefore be considered as the period of development that eventually resulted in the organization of the Chicago, Burlington and Quincy Railroad Company in 1855.

From June 22, 1852, to February 21, 1855, was a period of extreme financial, construction, and administrative activity, which in itself is a story of absorbing interest. First the extension of the road from Aurora to Mendota, and at the same time the financing and construction of the Central Military Tract Railroad, followed by assistance of these two roads in the completion of the Peoria and Oquawka Railroad (later the Peoria and Burlington) and the Northern Cross Railroad, and finally their absorption and consolidation into the Chicago, Burlington and Quincy Railroad.

The following letter turned up in some material acquired by our Financial Secretary, Mr. Howard F. Greene and was submitted for publication. Aside from the first paragraph, it contains an interesting description of the country in the middle west, through which our railroads were building in the early fifties. Certainly, there is little comparison with what it is today, brought about in some measure at least, by the building of our railroads.

The following letter was addressed to "George W. Bailey Esq. Rail Road Contractor, O & Pa R R, Wooster, Ohio."

Michigan City, March 13, 1853.

George W. Bailey Esq
Wooster, Ohio.

Dear Sir

Yours of the 1st inst was recd in due time & highly appreciated & in reply would say that I was pleased to here from you once more. but was very sorry to hear that your health was still poor & also that your Sister Hatty was so poorly for without health one can not enjoy much of this worlds goods. You write me that you had not heard (or rather) received a letter from me since Oct. last. Well now I dont understand how that can be for I am quite shure that I have answered evry letter that you have written me & have written you 2 or 3 times besides twice within 1 month before this. I thought very strange why you did not write me in answer to my letters. I wrote you in Feby also 5 or 6 of March. My wife has often asked me what I supposd the reason was that you did not write me & I am shure I could not tell only that I supposd that you had enough to do without writting me. I would like to hear from you often & I will endeavor to have you hear from me often. Well now for Rail Road business.

We have now gut to White Post 50 miles from M City through the worst country that I ever was in it is worse then it was on the Isthmus

of Darien when I crost it on my way to Cal White Post is a Town consisting of one log house called the White Post Hotel on what is called 7 Mile Prairie & it is about as interesting a place as it was where we gut our horses down last spring when we was going home from Grand Prairie. we run the ties up by engine & cars unload them into slews (for we cant find any dry land) & then float them in the ditches or any way to get them ahead of the iron. A pair of good horses will draw from 6 to 8 ties at a load where they can go at all. then they are taken from the Wagon, carried accrost the ditch 6 or 8 feet wide on a plank & layed down for the iron. the Road here is hove up from each side all the way. It takes out a ditch 6 or 8 feet wide & 2 to 3 feet deep. hence you see the necessity of carrying them accrost the ditch & the road bed is so soft (it being all shoveld up from the sides not being hardend by teaming over it) that horses will go to the bottom every step they take. but I keep the thing mooving (hard night & day almost). I am bound to run the Co out of iron chairs & spikes this week. I have only had spikes to spike joints & centers for the last 10 miles. we have iron to lay 4 miles farther but no chairs to fit it. so you see how I am situated (but such is life) I have gut the Gravel train agoing finally south of the Kankakee (or Isthmus as I call it) I am going to Lafayette this week to start the track laying this way. Stimpson is there now laying 2 miles from the Crawfordville Road into the City & I think that I shall let him continue on north of Lafayette with his gang the Prest says that he will give me 14 miles of that end to lay this spring—leaving 29 miles further to be layed from this end—and I can begin to feel satisfied that I shall get the Road through sometime— If it was not for the times I would swear that I would never take a 2d contract laying track through a flat, marshy cuntry—where no human white man did not or never can live—longer than 48 hours at any season of the year. We some times pass a small hut inhabited by a native man & woman with any no of little bratts which look like wild beings—some days the natives collect to gather from each side of the line of R R to the No of 200 men women & children to see the engine (& by the way they think it is a live Animel) & this is all the amusement that we have—a nother such a cuntry never was discovered nor never will be in my opinion—all the way I can keep the men is to tell them that we will soon see better days—that the good of the Land is yet ahead & so—but they say that it is getting worse & worse & I believe it but thank kind providence we have gut onto the last half. I wish you would come out & stay one week with us. you would see more in one day then I can write in 1 month of this God forsaken cuntry through which the New Albany & Salem R R passes—the best of all I think it will pay & I have the best of curage & very good health—wife is still quite feeble Irving is getting better I have gut about over my Squeeze between the Cars—my respects to your Fathers family—Perry & all his are well—Yours Respectfully

A. B. CULVER

Gauges—Standard and Otherwise

BY ROBERT R. BROWN

I have been a railfan for nearly half a century and particularly interested in gauges ever since the summer of 1914 when I first saw several narrow gauge lines—the Bridgton and Saco River and the Boston, Revere Beach and Lynn—and it was only then that I realized all railways were not the same width. Being blessed (or cursed) with an insatiable curiosity, I just had to find out why. How the different gauges originated and the reasons for their adoption. However, some of the reasons were not very satisfying and indicated that not too much thought had been given to the question. There are two schools of thought on historical research—there are those who limit themselves to the fully-documented printed word and ignore all else and there are those who prefer to gather, sift and analyze all of the available evidence and even include some rational conjecture when necessary. I make no apology for being one of the second group.

First of all, it seems evident that geographical factors played little, if any, part in the choice of gauges. Level countries are supposed to be better adapted to broad gauge lines and the narrow roads are supposed to be particularly useful in extremely mountainous regions but there are so many exceptions that these generalizations are meaningless. There was no flatter nor straighter line than the Boston, Revere Beach and Lynn but for some obscure reason it was built to a gauge of 3'0". Possibly this odd gauge hastened its end. Then, on the other hand, the climb up the Bore Ghat Incline, between Bombay and Poona, by the wide gauge Great Indian Peninsula Railway makes the slim gauge roads of Colorado look like toy trains running through a gently rolling prairie.

Our standard gauge of 4'8½" was no accidental selection but has descended directly from the wheel spacings of ancient times and its evolution followed a logical pattern. Other gauges were chosen for a great variety of reasons which may be classified as technical, economic or political, or the creation of a local transportation monopoly or, as in some cases, just plain cussedness. Practically every argument advanced in favor of any particular gauge can be refuted in the light of present knowledge or by actual exceptions but the arguments were impressive at the time and it is quite obvious that the promoters were sincere. However, we cannot say the same about some of the modern rail historians who do not trouble to look up the facts but let their imagination run riot. In recent years, several well-known magazines have published the astonishing, incorrect and very ridiculous statement that Julius Caesar invented chariots and that he personally established the gauge of the wheels by having a Roman soldier walk two paces—which measured exactly 4'8½"! Now, Julius Caesar was a very great man, in his own estimation anyway, but he did not invent the chariot nor the wheel gauge. Both dated back at least 3000 years before he was born.

The basic invention in the long chain of development of land transport was the introduction of the wheel; which apparently was first used in Assyria and then rapidly spread to all parts of the valleys of the Tigris and Euphrates. Clay models of two-wheeled carts and even four-wheeled covered wagons found on the site of Tepe Gowra, about 15 miles from Nineveh, prove beyond doubt that wheeled vehicles were in use before 3000 B. C. and perhaps long before. And, in passing, one may wonder if those ancient models were made in 0, 00 or H0 gauge! By 2000 B. C., such vehicles were in general use from the Indus valley to the coast of Syria and the Minoan kingdom in Crete. By 1600 B. C., their use had spread to Greece and Egypt and, by 1200 B. C., carts, wagons and chariots were in common use from China, in the east, to the British Isles, in the west.

Regular roads first appeared in Assyria during the reign of King Tiglath Pileser I, about the years 1120-05 B. C., and before long were quite common in the Middle East. Ancient history, as taught in schools, is little more than a very tiresome catalogue of wars, battles, tyrants, disasters and other gloomy episodes and the result is that we usually completely lose sight of the much more interesting fact that there were long intervals of peace, when civilization developed and international trade flourished and even travel for pleasure was possible. Persia and Greece were enemies for centuries but between wars there was much intercourse. The Persian Royal Road, built by King Darius, about 500 B. C., extended from Sardis, in Asia Minor, to Susa and later Persepolis, in Persia, a distance of 1700 miles and, although it was intended for the use of civil and military officials, it was also used by merchants and comparatively unimportant people who could and did move about safely and easily. About 440 B. C., Herodotus, the Greek historian, visited Babylon and Egypt as a tourist, just to satisfy his curiosity, and the story of his travels and his observations can still be read with interest. Some of these ancient Assyrian and Persian roads had grooves or small channels cut in parallel lines, like tracks, to guide the wheels of vehicles and in ancient Greece too there were many such groove-ways, some of which survive to the present day. On the road from Sparta to Helos, one can still see passing places, called *ektropoi*, just like the passing tracks of a modern railroad.

The greatest road builders of all time were the Romans and many of their roads, built 2000 years ago, still exist. The streets of Roman cities and the main highways were paved with closely-fitting polygonal blocks of stone, usually lava, which made a remarkably smooth surface—as smooth as any modern paved road and considerably more durable—and, where traffic was unusually heavy, there were parallel lines of stone slabs, with slightly concave tops, forming a sort of stone track—a method of road building used in parts of Europe until quite recently. But strangely enough, many of the fine old Roman roads and streets had groove-ways cut in the surface; lines which diverged and joined with layouts astonishingly like a modern single track street railway; as may be seen very clearly in several illustrations in the National

Geographic Magazine of November 1946. With such excellent road surfaces, one wonders why the groove-ways were needed. Probably the most reasonable explanation is that, at the height of its power, the city of Rome had a population of well over a million and, because the streets were narrow and crowded, vehicles were not allowed in the city between sunrise and sunset and consequently there must have been a tremendous traffic at night, bringing in food and supplies and taking out manufactured goods and refuse. If there were any street lights at all, they were torches or small oil lamps and not of much use and it is probable that the groove-ways were made to guide the vehicles through the dark streets and prevent the danger of collisions, and one may suppose also that lictors were stationed at all intersections and passing tracks to regulate traffic; in fact, without them there would have been complete confusion. And carrying our surmising a little further, we might even suppose that the fasces, the lictors' badge of office, was really a repair kit consisting of an axe, some extra wheel spokes and a length of rope!

Now, can we determine any relationship between the ancient groove-ways and our modern standard gauge? The use of the groove-ways compelled the use of national standard gauges, which varied from one country to another perhaps but we can be sure of one thing—they were all nearly alike and some simple measurement was used because the ancients did not bother much with fractions. Definite information on many points is lacking but judicious conjecture can fill many of the gaps and make it possible to reconstruct a reasonable story to show that the gauge for wheeled vehicles has been about five feet for at least fifty centuries. It is probable that the Assyrian gauge was five Assyrian feet of 10.8 inches, or about 4'6" in our measurements. The Greeks apparently had bigger feet because their gauge was a trifle wider. Existing Greek groove-ways have been measured and it has been ascertained that the grooves are $2\frac{1}{2}$ " wide, $2\frac{3}{4}$ " deep and the distance from centre to centre is $4'8\frac{3}{8}"$. So, if we allow a little for wear and erosion, we can assume that the width and the depth of the grooves were 3 digits, or 2.187 inches, and the space between the grooves was 54.63 inches, which was exactly $4\frac{1}{2}$ Greek feet of 12.14 inches. The Roman groove-ways were broad gauge, 5'4" centre to centre, so the space between the grooves was 5'2"—exactly three Roman cubits.

During the Roman occupation of Britain, the Roman standard gauge was used as can be determined quite easily by examining remains of Roman roads and, more accurately, the gateways in Hadrian's Wall built about 120 A. D. Nothing is known about the Anglo-Saxon period and it is difficult to reconcile any known gauge with the Anglo-Saxon system of measurement:

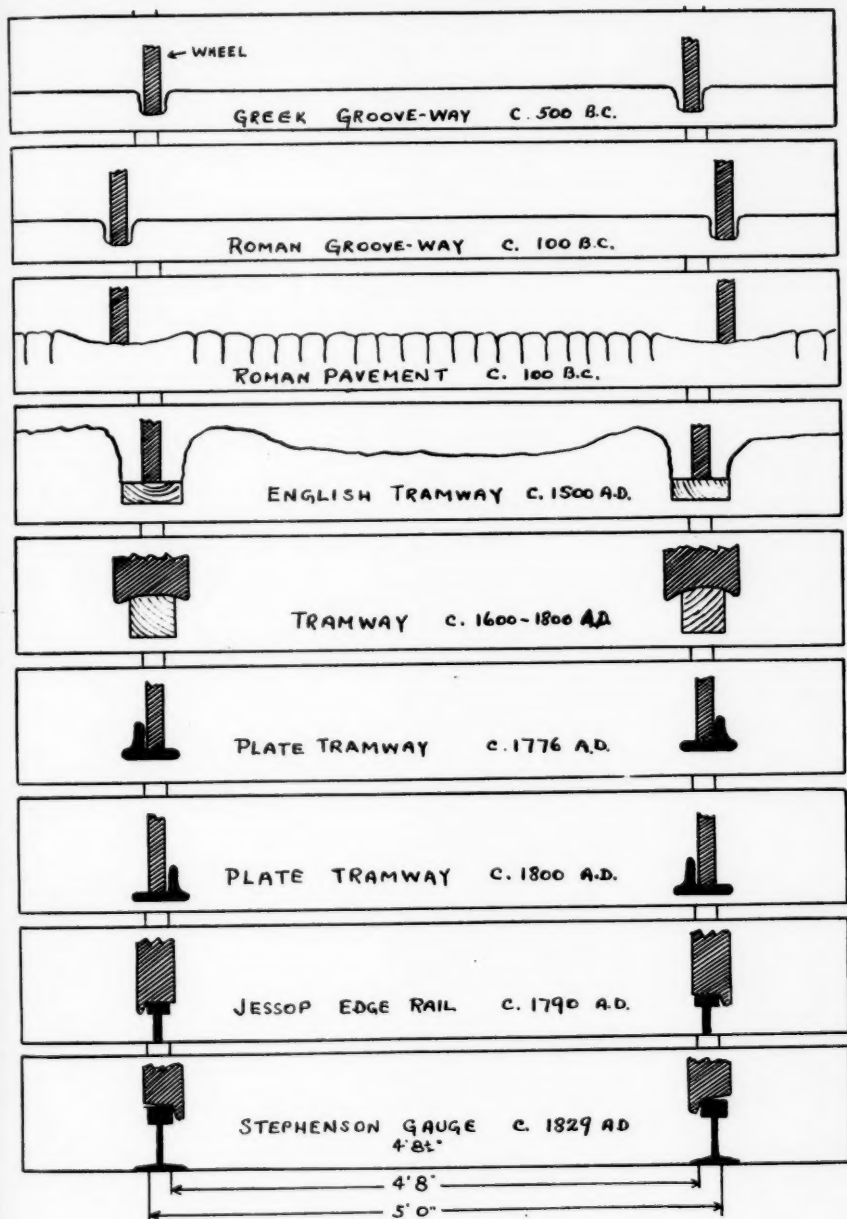
10 digits	— 1 double hand	— 7.92"
10 double hands	— 1 saxofathom	— 79.2" or 6'7.2"
10 saxofathoms	— 1 furlong	— 66 feet.

When the use of vehicles was revived in the early middle ages, no doubt, some individual looked at an old Roman road, measured it roughly with his feet and found the gauge to be about five feet. Probably the measurement wobbled between $4\frac{1}{2}$ and $5\frac{1}{2}$ feet for a hundred years or more but eventually it settled at five standard feet.

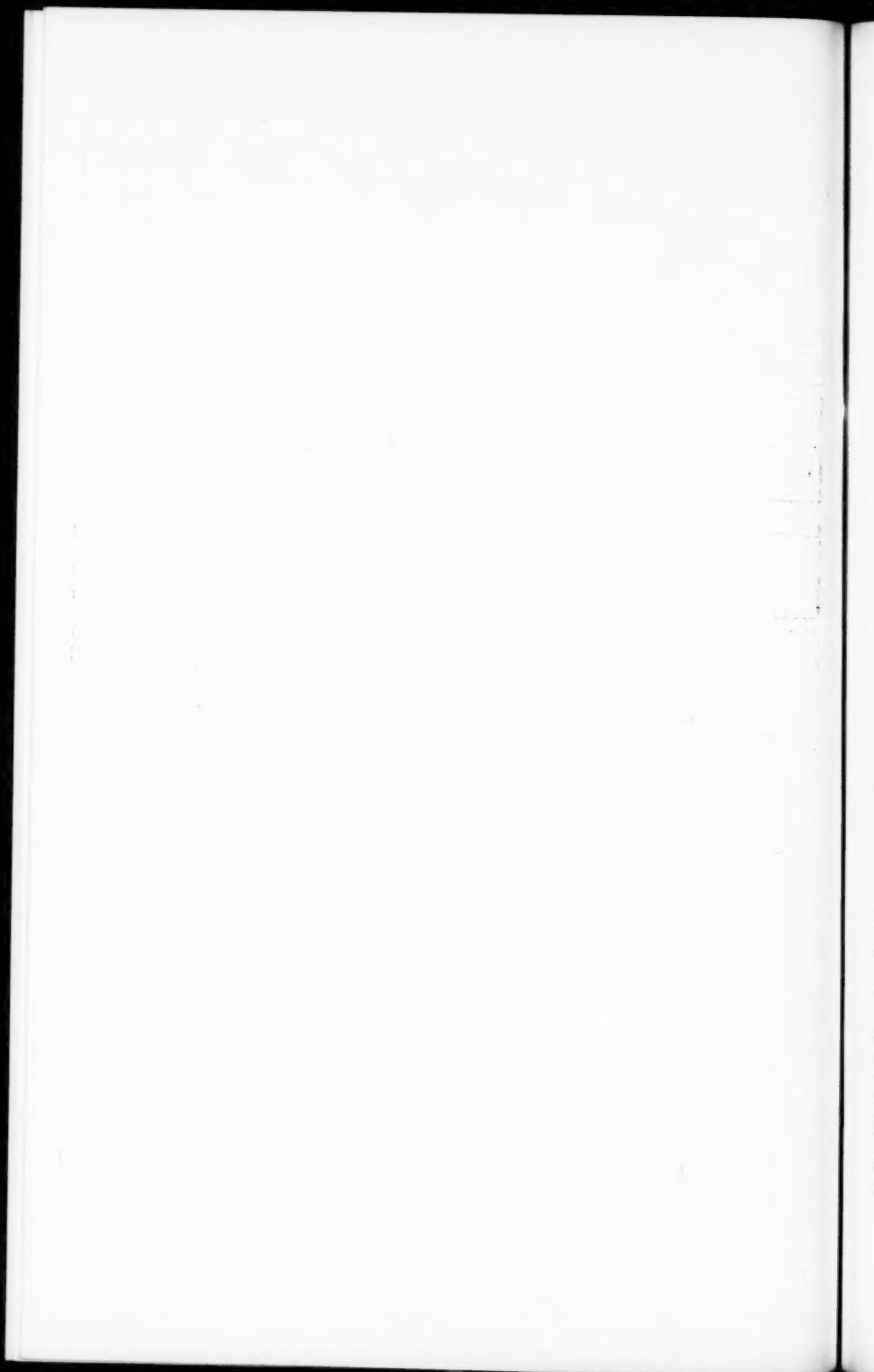
Coming down to more modern times, horse-drawn carriages, wagons and carts are now almost a thing of the past but many of us can remember the time when they were very common and when there were very few automobiles. The streets were generally in very bad condition, unpaved and with many ruts and holes in the neglected surface. The iron tires of wagons and drays were from 2 to 3 inches wide and the wheels were so spaced that the wheels could run along the tops of the rails of the trolley lines. Teamsters were very skillful in guiding their wagons along the rail tops and did so frequently as it made it much easier for the horses to pull heavy loads. However, it was rather dangerous as the rail heads were often raised an inch or two above the road and upsets were frequent and it was to prevent this rail-riding that the city of Toronto invented its unique gauge of $4'-10\frac{7}{8}"$. All this points to the fact that there was a definite relationship between the wheel spacing of wagons and the railway gauge. Carriage and wagon builders had a recognized standard gauge for the wheels of vehicles—five feet outside to outside and an inside measurement varying from $4'6"$ to $4'10"$ depending on the width of the tires. The outside measurement was the controlling one because in alleys, loading docks, gates and other places where there was a restricted clearance, there commonly were stone curbs to confine the wheels to a pre-determined path. This standard undoubtedly was very ancient, dating back at least to the XV century.

After the fall of the Roman Empire, the art of road building was lost for many centuries and around 1500 A. D. the only possible means of moving freight in England was along the coast in ships or inland by packhorses. Carts and wagons were known but generally used for only short hauls. About that time, the forests were disappearing rapidly and the consequent serious shortage of fuel led to the opening of numerous coal mines. Most of them were located in sparsely settled areas, where there were no proper roads, and this meant carting the coals to the nearest river or harbour under the worst possible conditions. The wheels of the carts soon cut deep ruts in the muddy lanes and this reduced the load that a horse could pull. Filling the ruts with stones did not help much but someone thought of the idea of laying oak planks in the ruts and this made such an improvement that a horse's load could be increased from 1900 to 4700 pounds. There are records of such lines in 1555 but it is evident they had been in use long before that.

This developed into a real tramway and for about two hundred years, from 1600 to 1800, the most common type had wooden rails and the wagons, instead of wheels, had rollers with concave treads, very much like pole tramways still used occasionally in lumbering operations. The rails originally were formed of scantlings of good sound oak and



The Development of our Standard Gauge.



were connected by sills or cross timbers of the same material, pinned together with oak trenails. The rails wore out rapidly and soon an additional wearing rail, which could be renewed easily when worn, was placed on top of the supporting rail and, still later, cast iron plate rails were used. In 1776, John Curr designed and made some improved cast iron plate rails which in section were like modern angle iron. The wheels ran on the horizontal surface and the rails were so laid that the vertical ridge or trammel, which guided the wheels, was on the outer edge. Since ordinary carts and wagons were used, the distance between the trammels was determined by the old wagon gauge of 5 feet outside. Later the trammels were reversed, with the trammels inside, and the gauge became 5 feet less the width of two tires which made it about 4'8". These fairly satisfactory flange rails were used extensively and it was on such a line, at Pen-y-darren, that Trevithick's first locomotive ran in 1804, but stones and dirt collected on the running surface and interfered with the free running of the wheels. Something better was needed. Flanged wheels were used as early as 1734 but did not come into general use until after Jessop invented his edge rails in 1789. The same old wagons were used but with new wheels, so the gauge remained the same. At first the flanges of the wheels ran along the outsides of the rails and the gauge was still 5 feet outside. The rails were 2 inches wide, so the space between was 4'8". With the advent of the steam locomotive, the pioneer builders, seeing in these tramways a possible market for their machines, desired to build them to meet as nearly as possible the existing conditions. George Stephenson realized the need of coned wheels and he modified the practice of flanges bearing on the outer edges of the rails by placing the wheels on the axles so the flanges would run along the inner edges and so the new gauge was the distance between the rails—4'8". The Stockton and Darlington, the Canterbury and Whistable and the Liverpool and Manchester Railways were built to this gauge but it was soon found that the flanges were too close to the rails, causing excessive friction and wear. It was not possible to rebuild the rolling stock because already there were too many units—one colliery alone had over 600 wagons in use—so Stephenson did the only possible thing; he widened the track half an inch, to 4'8½", but left the wheels unchanged and this half inch of lateral play so effectively afforded relief that Stephenson adopted it as the gauge to which he subsequently built all his railways. Just when this change was made is not definitely known but it could not have been earlier than 1829 and not later than 1830.

For a time it appeared as if all railways would be standard gauge, although the Liverpool and Manchester almost adopted a gauge of 5'6", but a few years later Isambard Kingdom Brunel, chief engineer of the Great Western Railway, selected the very wide gauge of 7 feet for his company. The usual arguments were advanced about the more powerful and speedier locomotives and the larger and steadier cars but the real reason, as Brunel himself admitted, was the creation of an exclusive monopoly. As an engineer, Brunel was a genius but as an economist he was quite the reverse.

When railroads were first built in the United States they went to England for their motive power requirements and it is believed quite generally that they adopted the Stephenson gauge to suit the imported locomotives. Such was not the case, however, and the records of Robert Stephenson & Company show that they built locomotives for American railroads to suit gauges selected by the railroad without any reference to the Stephenson gauge in England. Only in the New England states was the Stephenson gauge adopted in the beginning. Others were:

Delaware and Hudson	4'3"
Baltimore and Ohio	4'6"
Mohawk and Hudson	4'9"
Saratoga and Schenectady	4'9"
Philadelphia and Columbia	4'9"
Baltimore and Susquehanna	4'9 $\frac{1}{4}$ "
Camden and Amboy	4'9 $\frac{3}{4}$ "
New Jersey	4'10" (or 4'9 $\frac{3}{4}$ "?)
Southern roads	5'0"
Louisiana roads	5'6"

There were similar variations elsewhere too. In Scotland, prior to 1845, there were three gauges; 4'6", 4'8 $\frac{1}{2}$ " and 5'6". The gauge on the European continent was not and is not standard, as is usually supposed, but actually is 1.45 metres or 4'9" and, of course, the Russian gauge, suggested by George W. Whistler, was another minor variation.

Perhaps the most curious of all is the Irish gauge of 5'3" which subsequently was transplanted by Irish engineers to Australia and Brazil. The first railway on the Emerald Isle was the Dublin and Kingston, opened in 1834, which adopted the Stephenson gauge of 4'8 $\frac{1}{2}$ ". The Ulster Railway, from Belfast to Armagh, adopted the unique gauge of 6'2" and then the Dublin and Drogheda was built to the then unheard-of gauge of 5'3". The Ulster and the Drogheda railways would eventually form parts of a through line between Dublin and Belfast but they were so short-sighted they deliberately chose different gauges so that, if the two lines ever met, neither company would be able to use the rolling stock of the other.

A Royal Commission was set up to investigate and report on the muddle and to try to arrange a mutually-satisfactory compromise but Celtic obstinacy proved to be a stumbling block. All agreed that a uniform gauge was desirable and, in fact, necessary but no one would admit that any other gauge but his own would do. It is said that an English inspector of the Board of Trade, exasperated by such perversity, wrote down the three existing gauges and calculated the average which proved to be almost 5'3" and he jokingly suggested this as the Irish standard gauge. And believe it or not, the Kingston and the Ulster companies, which absolutely refused to change to the 5'3" gauge of the Drogheda company, were quite willing to change to the proposed new Irish standard of 5'3"! Such reasoning baffles the non-Irish. However it was a foolish choice because, if the Stephenson gauge had been

chosen, interchange by carferry with Great Britain and the continent would have been possible and profitable and, more important still, far-away Australia would have been spared a tremendous amount of trouble and expense.

Before long, many other gauges appeared and in spite of the many plausible reasons advanced it is obvious that geographical factors played a small part, if any, in the selection and that most of them were chosen for political reasons, to establish local monopolies, for supposed cheapness of construction and, in the case of the wide gauges, the possible larger rolling stock and more powerful engines. The Russian gauge of 5'0" and the Spanish gauge of 5'5 $\frac{1}{4}$ " were chosen for political reasons to prevent or impede invasion from near-by countries. Both had good reasons to remember Napoleon.

The Great Western Railway, in England, adopted Brunel's gauge of 7'0" to prevent interchange with other railways and to prevent invasion of its territory by other companies and the Erie Railroad adopted its gauge of 6'0" for the same reasons.

Down east in the state of Maine, John A. Poor and his associates decided that the trade of that area would center in the then little city of Portland and that none of it would continue on to its hated rival Boston so they adopted the old Scottish gauge of 5'6". The British North American provinces, which had not yet united to form the Dominion of Canada, were planning a grand trunk inter-colonial railway, which would use the railroads of Maine, temporarily at least, to bridge the gap between the valleys of the St. Lawrence and St. John rivers and, as a result, New Brunswick, Nova Scotia and Canada adopted the Maine gauge. The principal reason was that the line between Montreal and Portland was 5'6" and nearly completed but there were political reasons too although the fact was not stressed at the time. It was government policy to force trade to flow east and west, by artificial means if necessary, and to discourage north and south traffic, and there were still vivid memories of the many attempted Yankee invasions in the War of 1812, so the broad gauge was welcomed as a means of impeding border crossing except on the one line to Portland.

Out in India they started from scratch, there were no limitations of any kind and it was thought that there never would be physical connection with the railways of any other country, so they adopted the broad gauge of 5'6". Later on, because of the supposed cheapness of construction, they foolishly built many trunk lines of metre gauge, 3'3 $\frac{1}{4}$ ", and feeders of 2'6" and 2'0". I have travelled many hundreds of miles on the Indian broad and metre gauge lines and a few miles of 2'0" and I have no hesitation in expressing a preference. On the broad gauge, the overhang of the cars on each side represents about 20% of the width of the car but on the metre gauge is 30%. The broad gauge cars glide along with remarkable smoothness and steadiness but the metre gauge cars pitch and roll in an alarming fashion and, at night, one is often thrown off the narrow longitudinal bunks.

Of the narrow gauges, probably 3'6" was the most successful. It is still the standard in New Zealand, parts of Australia, most of Africa, Japan and several other areas. It was never very popular in the United States but there was a lot of it in Canada at one time and still survives in the Newfoundland Division of the Canadian National Railways—probably the most modern slim gauge line in the world.

The principal arguments in favor of the narrow gauge lines were their cheapness and their ability to climb up the side of a barn and turn corners which would break a snake's back but actually the high operating costs offset the initial low cost and there are many standard gauge lines which do anything a narrow gauge line could do in difficult country. Around 1870, two railways were built through the part of Ontario north of Toronto, both meeting exactly the same conditions. The narrow (3'6") gauge Toronto, Grey and Bruce Railway cost \$21,776.00 per mile while the Midland Railway, 5'6", cost \$32,031.00 per mile. This looked like a substantial saving in favor of the narrow gauge but one Midland box car could carry as much as four similar cars on the T. G. & B. and it was realized, even when the lines were being built, that sooner or later they would have to be converted to standard gauge. The cost of narrowing the Midland was negligible—it just meant pushing one rail inward 9½ inches—but the Toronto, Grey and Bruce had to rebuilt at enormous cost. A wiser plan was that followed by the Canadian Northern Railway on the prairies. During the first fifteen years of the present century, two extensive railways were built through the sparsely settled Canadian west, parallel to each other and quite close most of the way. The Grand Trunk Pacific Railway was a first class trunk line, well-built in every way, and cost \$85,276.00 per mile, while the Canadian Northern Railway was built as cheaply as possible, consistent with safe operation, and cost only \$45,786.00 per mile, with subsequent improvements paid for out of earnings.

In the matter of freight rates too the narrow gauge lines suffer, especially in the case of interchange. Shippers are given substantial reductions on car load shipments and where these are routed from a standard to a narrow gauge line, or vice versa, not only is there the heavy cost of unloading and reloading but two or more narrow gauge cars are needed to handle one car load shipment. In some cases, in the old days, cars were lifted bodily from one set of trucks and then lowered on to trucks of the different gauge or, as was done on the Grand Trunk years ago, cars had adjustable wheels which could be unlocked and moved on the axles to suit one of the two gauges but these expedients were very expensive and troublesome and it is generally agreed now that there is no economy in operating a railway differing from the prevailing standard gauge.

There is not much use in thinking about what might have been. From a mathematical point of view, the Stephenson gauge of 4'8½" is a monstrosity but we are stuck with it and we must live with it even though we know now that a gauge of 5'0" would have been much better since 60" is divisible by 2, 3 and 5. From a technical point of view,

a still wider gauge of 5'6" would have been more useful. No one knows the maximum capacity of the broad gauge and even in India they have only scratched the surface but it must be greatly in excess of the standard gauge. As a comparison, in New Zealand and South Africa, where the narrow gauge has reached its greatest development, there are locomotives which are bigger, heavier and more powerful than anything on the standard gauge lines of Europe. Another argument in favor of the wider gauge is the greater accessibility of the machinery. When the Grand Trunk Railway changed from broad gauge to standard, the shop and roundhouse men complained bitterly about the narrower locomotives and the less convenient working space between the frames and for years they regretted the passing of the 5'6" gauge.

Mr. Robert R. Brown, author of the above article, is engaged in constructing a roster of locomotives that saw service in this country prior to 1840. Information is needed on the locomotives of some of these roads in New York, Pennsylvania, Virginia and the southern states. If any of our members have any data, other than has already appeared in our publication, on any of these roads, Mr. Brown will welcome this assistance and he should be addressed at 731 42nd Ave., Lachine (33), Quebec, Canada.

Additions and Corrections to Locomotive Rosters of the Florida Railroads in Bulletin No. 86

It is often the case in the publication of locomotive rosters that, no sooner than they appear in print, attention is called to errors and omissions. It would seem that it is hardly within the scope of one person's ability to gather ALL of the existing information regarding a railroad's motive power, nor to present data that are accurate in every last detail, and in complete agreement with all other known facts.

It is regrettable that the rosters in Bulletin No. 86, the excellent account of the Florida railroads, by George W. Pettengill, Jr., are no exception to this condition and, despite the author's diligence and careful research, publication of the roster in his bulletin brought to light so much additional material that your editor considered it both advisable and desirable to republish the roster of some of these roads, showing the lately acquired corrections and additions.

In fairness to the author it should be stated that the history of the engines on a number of the railroads in question is extremely complicated, "official" records were not available in all cases, and his task was not simplified by the fact that, in a number of instances, the records of the railroads and those of the builders do not agree.

That this additional material can be presented is due to the efforts and co-operation of our members, especially Mr. R. B. Carneal, of Durham, N. C., and Prof. S. R. Wood, of Stillwater, Okla., both of whom have been most generous with their time and in making their records available. It is a pleasure to acknowledge their able assistance and the benefit of their extensive locomotive records and knowledge.

Page 17. There were at least three early Baldwin engines on the Lake Wimico & St. Joseph R. R., as follows:—

B. L. W. No. 41, "Philadelphia," August, 1836.

B. L. W. No. 42, "St. Joseph," August, 1836.

B. L. W. No. 137, no name, November, 1838.

No further data are available regarding these engines, except that the "Philadelphia" may have been renamed "Wimico," or No. 137 may have been given that name.

Page 21. F. A. & G. C. engine "Jacksonville" became F. C. & P. No. 26.

Page 39. Baldwin No. 5350, built in 1880, was Florida Central No. 5, a 4-4-0 with 15"x24" cylinders and 60½" drivers. Name, "Thomas Dowling." Its disposition is unknown, and it is not found in the records of the F. C. & P.

There are records of two engines of the Pensacola & Perdido R. R., viz.,

No. 4, Baldwin No. 3557, March, 1874, 2-4-0.

No. 6, Baldwin No. 8193, October, 1886, 2-4-0.

Locomotives of the F. C. & P. R. R.

Pages 59-62.

It is now known that T. O. & A. Nos. 1 and 2 became F. C. & P. Nos. 58 and 59, and were later S. A. L. Nos. 339 and 340, respectively.

The 0-6-0's which replaced the "Suwanee" and "James T. Archer," became second Nos. 2 and 3, respectively.

Engines Nos. 1 and 2, of the E. F. & A., may have become second Nos. 4 and 6 on the F. C. & P., and then S. A. L. Nos. 304 and 305.

A revised roster of the F. C. & P. locomotives is presented herewith.

Locomotives of the F. C. & P. R. R. and Predecessor Lines

FCP		1st		SAL					Remarks.
No.	Name	Owner	Builder	C/N	Date	Ty.	Cyls.	DD #s	
1	Nassau	P&G	Baldwin	896	1859	4-4-0	12x22	60	—
1		FR&N	Rogers	4130	1889	0-6-0	16x24	44	301-490
2	Suwanee	P&G	Rogers	913	1860	4-4-0	12x22	60	—
2		FR&N	Rogers	4137	1889	0-6-0	16x24	44	302-491
3	Jas. T. Archer	P&G	Rogers	949	1860	4-4-0	12x22	60	—
3		FC&P	Rogers	4968	1894	0-6-0	16x24	50	302-492
4	Alachua	FRR	Rogers	898	1860	4-4-0	15x22	60	—
4			Grant	1211	1878	0-4-0	10x22	44	304
5	Marion	FRR	Rogers	902	1860	4-4-0	15x22	60	—
6	Starke	FRR	R. I.	161	1869	4-4-0	15x22	54	—
6			R. I.			0-6-0	17x24	44	305
7	Gainesville	FRR	R. I.	162	1869	4-4-0	15x22	54	—
8	Cedar Key	P&G	Baldwin	962	1860	4-4-0	12x22	60	—
9	David Yulee	P&G	Rogers	972	1860	4-4-0	13x22	54	—
9			Schenect	838	1872	4-4-0	16x24	60	306
10	Gov. Marvin	P&G	Rogers	1324	1866	4-4-0	14x22	60	—
10			Schenect	846	1872	4-4-0	16x24	60	307
11	Santa Fe	P&G	Rogers	977	1860	4-4-0	13x22	54	—
11			?			4-4-0	16x24	61	308
12	E. N. Dickerson	AGWIT	Rogers	2583	1880	4-4-0	14x22	62	—
13	M. O. Roberts	AGWIT	Rogers	2607	1880	4-4-0	14x22	62	309
14	Panasoffkee	AGWIT	Rogers	2824	1881	4-4-0	17x24	56	310
15	Clay	AGWIT							—
16		AGWIT							—
17	Key West	AGWIT	Rogers	2889	1881	4-4-0	15x24	62	311
18	Havana	AGWIT	Rogers	2890	1881	4-4-0	15x24	62	312
19	?	AGWIT	Rogers	3070	1882	4-4-0	15x24	56	313
20		AGWIT	Rogers	3071	1882	4-4-0	15x24	56	314
21	Orange	FT&P	Rogers	3457	1884	4-4-0	17x24	56	315
22	Hillsboro	FT&P	Rogers	3458	1884	4-4-0	15x24	56	316
23	Baker	FT&P	Rogers			4-4-0			—
24	Columbia	TRR	Baldwin	706	1856	4-4-0	12x20	54	—
25	Gen. Bailey	TRR	Baldwin	741	1857	4-4-0	12x22	50	—
26	Jacksonville	FA&GC				4-4-0			—
27	David Macey	FA&GC	Rogers	1023	1862	4-4-0	16x22	54	—
28	G. B. Robinson	FA&GC	Rogers	1060	1863	4-4-0	16x22	54	—
29	Indianapolis	FA&GC	Rogers	1090	1863	4-4-0	16x22	54	—
30	F. Gilman	FA&GC	Rogers	1279	1865	4-4-0	16x22	54	—
31	Apalachicola	P&G	Rogers	1327	1866	4-4-0	14x22	60	—
32	St. Marks	P&G	Rogers	1332	1866	4-4-0	14x22	60	—

FCP No.	Name	1st Owner	Builder	C/N	Date	Ty.	Cyls.	DD	SAL \$'s	Remarks.
33	Ochlockonee	P&G	Rogers	1334	1866	4-4-0	14x22	60	—	
34	Madison	P&G	Rogers	1336	1866	4-4-0	14x22	60	—	
35	Leesburg #1	L&I R				4-4-0			—	
36	Wildwood #2	L&I R				4-4-0			—	
37	Hamilton	FR&N	Rogers	3497	1884	4-4-0	17x24	56	318	
38	Jefferson	FR&N	Rogers	3498	1884	4-4-0	17x24	56	319	
39	Gadsden	FR&N	Rogers	3527	1885	4-4-0	17x24	56	320	
40	Polk	FR&N	Rogers	3528	1885	4-4-0	17x24	56	321	
41	Manatee	FR&N	Rogers	3536	1885	4-4-0	17x24	56	322	
42		FR&N	Rogers	3538	1885	4-4-0	17x24	56	323	
43		FR&N	Rogers	3599	1885	4-4-0	17x24	56	324	
44		FR&N	Rogers	3600	1885	4-4-0	17x24	56	325	
45		FR&N	Rogers	3604	1885	4-4-0	17x24	56	326	
46		FR&N	Rogers	3601	1885	4-4-0	17x24	56	327	
47		FR&N	Rogers	3605	1886	4-4-0	16x24	62	328	
48		FR&N	Rogers	3606	1886	4-4-0	16x24	62	329	
49		FR&N	Rogers	3623	1886	4-4-0	16x24	62	330	
50		FR&N	Rogers	3624	1886	4-4-0	16x24	62	331	
51		FR&N	Rogers	3629	1886	4-4-0	16x24	62	332	
52		FR&N	Rogers	3633	1886	4-4-0	16x24	62	333	
53		FR&N	Rogers	3634	1886	4-4-0	16x24	62	334	
54		FR&N	Rogers	3635	1886	4-4-0	16x24	62	335	
55		FR&N	Rogers	3640	1886	4-4-0	16x24	62	336	
56		FR&N	Rogers	3670	1886	4-6-0	18x24	56	356	To FC&P 201
56		FC&P	Richmond	2156	1891	4-4-0	17x24	62	337	
57		FC&P	Richmond	2157	1891	4-6-0	18x24	62	338	
58	Tavares #1	TO&A	Rogers	3555	1885	4-4-0	17x24	62	339	
59		FR&N	Rogers	4130	1889	0-6-0	16x24	44	301	To FC&P 1
59	Orlando #2	TO&A	Rogers	3558	1885	4-4-0	17x24	62	340	
60		FC&P	Rogers	4930	1893	4-4-0	19x24	68	341-161	
61		FC&P	Rogers	4931	1893	4-4-0	19x24	68	342-162	
62		FC&P	Rogers	4963	1893	4-4-0	19x24	68	343-163	
63		FC&P	Rogers	4964	1893	4-4-0	19x24	68	344-164	
64		FC&P	Rogers	4965	1893	4-4-0	19x24	68	345-165	
65		SB 3	Baldwin	11620	1891	4-4-0	17x24	62	346	
66		SB 4	Baldwin	11629	1891	4-4-0	17x24	62	347	
67		SB 6	Baldwin	12183	1891	4-4-0	17x24	62	348	
68		SB 5	Baldwin	12188	1891	4-4-0	17x24	62	349	Wok'd, Durham Br. '10.
69		FC&P	Rogers	5065	1896	4-4-0	19x24	68	350-155	
70		FC&P	Rogers	5101	1896	4-4-0	19x24	68	351-156	
71		FC&P	Rogers	5156	1897	4-4-0	19x24	68	352-157	
72		FC&P	Rogers	5157	1897	4-4-0	19x24	68	353-158	
73		FC&P	Cooke	2415	1898	4-4-0	18x28	69	354-159	
74		FC&P	Cooke	2416	1898	4-4-0	18x28	69	355-160	
201		FR&N	Rogers	3670	1886	4-6-0	18x24	56	356	From 56.
202		FR&N	Rogers	3672	1886	4-6-0	18x24	56	357-1510	
203		FR&N	Rogers	3673	1886	4-6-0	18x24	56	358	
204		FC&P	Richmond	2158	1891	2-6-0	19x24	50	359	So. Raleigh & Charleston R.R.
205		FC&P	Richmond	2159	1891	2-6-0	19x24	50	1st 360	
206		FC&P	Richmond	2160	1891	2-6-0	19x24	50	361	
207		FC&P	Rogers	4495	1891	4-6-0	18x24	54	362-1512	
208		FC&P	Rogers	4496	1891	4-6-0	18x24	54	363-1513	
209		FC&P	Rogers	4941	1893	4-6-0	19x24	60	364-1540	
210		FC&P	Rogers	4942	1893	4-6-0	19x24	60	365-1541	
211		FC&P	Rogers	4943	1893	4-6-0	19x24	60	366-1542	
212		FC&P	Rogers	4944	1893	4-6-0	19x24	60	367-1543	
213		FC&P	Rogers	4948	1893	4-6-0	19x24	60	368-1544	

FCP No.	Name	1st Owner	Builder	C/N	Date	Ty.	Cyls.	DD #s	Remarks.
214		FC&P	Rogers	4949	1893	4-6-0	19x24	60 369-1545	
215		FC&P	Rogers	4950	1893	4-6-0	19x24	60 370-1546	
216		SB 7	Baldwin	12232	1891	2-6-0	19x24	48 371	
217		SB 8	Baldwin	12233	1891	2-6-0	19x24	48 372-2372	
218		SB 9	Richmond	2333	1892	4-6-0	19x24	50 373	
219		SB 10	Richmond	2334	1892	4-6-0	19x24	50 374	

Locomotives of the Florida Southern

Pages 74-75.

No. 1 was a Brooks 2-6-0, C/N 284, built in 1876 as Emlenton & Shippenville No. 2. Cylinders, 11"x16"; D. D. 36".

No. 5, Grant No. 1059, was built in 1873.

Since the two Baldwin 4-4-0's of the St. J. & L. E., shop numbers 4727 and 4764, went to the Florida Southern, by the lease of January 1st, 1885, it is possible that these engines are among the narrow gauge engines of the F. S., for which no information is shown.

Engines numbered between 32 and 54, inclusive, were NOT re-numbered to the F. S. 700 series, as suggested in Bulletin No. 86. Only the eight engines built in 1888 to 1894, viz., 25-28 and Nos. 71, 75, 76 and 81, were so changed, being given Nos. 701-708, respectively.

Locomotives in the 40 series were all assigned to the F. S. by the S. F. & W., and the same questions regarding shop numbers exist here, as those described in the S. F. & W. roster. Corrections regarding these engines follow.

No. 40, Rogers No. 2949, was not renumbered 439. Its disposition is not known.

No. 41, Rogers No. 2955 (?), not No. 3971, which did not go to the F. S. Disposition of No. 2955 (?) is not known.

No. 42 was Rogers No. 2956 (?); disposition not known.

Nos. 43 thru 46, correct shop numbers were 2951 thru 2954, respectively, according to A. C. L. records.

South Florida Railroad Locomotives Narrow Gauge Engines

Pages 79-80.

No.	Builder	C/N	Date	Type	Cyls.	DD	Remarks
1							No data.
2	Baldwin	5435	1881	2-6-0	9x16	35	"Herald." Sold to Orange Belt #1.
3							No data.
4	Baldwin	5990	1882	4-4-0	9x16	42	"Jas. T. Sanford." To Orange Belt #2.
5	Baldwin	6294	1882	4-4-0	9x16	42	To Orange Belt #3.
6	Baldwin	6660	1883	4-4-0	11x16	42	"E. B. Haskell." To Orange Belt #4.
7	Mason	704	1883	0-4-4T	13x16	43	"R. M. Pulsifer."
8	Mason	705	1883	0-4-4T	13x16	43	"H. B. Plant."
9	Mason	707	1883	0-4-4T	13x16	43	"H. S. Haines."
10	Baldwin	6978	1883	4-6-0	14x20	45	To Savannah & Statesboro. To Porter-Wadley Lbr. Co., Alexander Lbr. Co. #4.

No.	Builder	C/N	Date	Type	Cyls.	DD	Remarks
11	Baldwin	6991	1883	4-6-0	14x20	45	
12	Baldwin	7047	1883	4-6-0	14x20	45	Sold to Charleston Mining & Mfg. Co.
13	Baldwin	7048	1883	4-6-0	14x20	45	Sold to Dutton Phosphate Co.
14-16							No data
17	Baldwin	7759	1885	4-4-0	15x18	52	
18	Baldwin	7763	1885	4-4-0	15x18	52	Sold to Ashley-Price Lbr. Co.
19	Baldwin	7795	1886	4-4-0	15x18	52	
20	Baldwin	7798	1886	4-4-0	15x18	52	

Standard Gauge Engines

SFW ACL							Remarks	Disp'n
No.	Builder	C/N	Date	Type	Cyls.	DD No. No.		
1	Baldwin	8083	1886	2-6-0	17x24	52 201 603		Sc. 5-24-17
2	Baldwin	8084	1886	2-6-0	17x24	52 202 604		Sc. 9-14-17
3	Baldwin	8086	1886	2-6-0	17x24	52 203 605	Weldon Lbr. Co.	So. 3-10-13
4	Baldwin	8090	1886	2-6-0	17x24	52 204 606		Sc. 8-25-17
5	Baldwin	8074	1886	4-4-0	15x24	58 205 446	(1st) Gone by 1905	
6	Baldwin	8075	1886	4-4-0	15x24	63 206 447	(1st) GC&L Co. Ingram-Deckle L. Co. #42 1909	Sc. 5-1-08
7	Baldwin	8080	1886	4-4-0	15x24	63 207 445	To Drew Lbr. Co.	
8	Baldwin	8077	1886	4-4-0	15x24	58 208 448	Melton Lbr. Co. So. 1-1908	
9	Baldwin	8078	1886	4-4-0	15x24	58 209 449	GC&L Co.	So. 3-18-06
10							No data.	
11							See roster notes.	
12-13							No data.	
14	R. I.	1729	1886	4-6-0	17x24	50 214 250	To 1250; ex-W&A #57.	
15-21							No data.	
22	Baldwin	8303	1886	0-4-0	14x24	48 222 160	To 2nd #104. to EC&L Co.	So. 5-1-05
23	Baldwin	11457	1890	4-4-0	17x24	64 223 532		Sc. 10-29-25
24	Baldwin	11465	1890	4-4-0	17x24	64 224 533		Sc. 10-17-25
25	Baldwin	11458	1890	4-4-0	17x24	64 225 534		Sc. 6-7-23
26	Baldwin	11461	1890	4-4-0	17x24	64 226 535		Sc. 5-31-26
27	Baldwin	11470	1890	2-6-0	18x24	52 227 660		Sc. 10-19-33
28	Baldwin	11468	1890	2-6-0	18x24	52 228 661	Miss. Ry.	So. 9-14-23
29	Baldwin	11469	1890	2-6-0	18x24	52 229 662		Sc. 12-5-33
30	Rogers	4670	1892	2-6-0	18x24	56 230 663	ex-SF&W #93	Sc. 11-3-33
31							No data.	
32							ex-StC&SB #2.	
33	Baldwin	11826	1891	4-4-0	17x24	64 233 536	ex-StC&SB #3	Sc. 6-23-23
	Baldwin	12051	1891	2-6-0	17x24	56 234 627	ex-SSO&G #4-800	Sc. 9-20-24
	Baldwin	9490	1888	4-4-0	16x24	63 235 557	ex-SSO&G #2-801	Sc. 7-9-14
	Baldwin	7727	1885	4-4-0	16x24	62 236 559	ex-SSO&G #1-802	Sc. 8-3-04
	Baldwin	11630	1891	4-4-0	16x24	63 237 558	ex-SSO&G #3-803	Sc. 9-20-06
	R. I.	2123	1888	2-6-0	17x24	54 238 642	ex-SF&W #21	Sc. 9-25-24
	R. I.	2124	1888	2-6-0	17x24	54 239 643	ex-SF&W #22	Sc. 6-23-23

South Florida R. R. Locomotives

Pages 79-80.

The South Florida narrow gauge engines included Baldwin No. 4105, an 0-6-0T or 0-6-2, named "Kissimmee," which was originally N. Y. & Manhattan Beach No. 3, "Sea Breeze," cylinders 9"x16", and 36" drivers. Its S. F. number is not known.

The engine shown as No. 11, B. L. W. No. 2242, in Bulletin 86, was originally Petersburg R. R. No. 11. It later became A. C. L. No. 251; in 1900, it was changed to No. 450, and, in 1916, to No. 1450. It was never on the South Florida.

Petersburg No. 12, B. L. W. No. 2535, may have been S. F. No. 11. It was sold to the Hawkinsville & Florida Southern, No. 9, prior to 1915, but was never on the Atlantic Coast Line.

Locomotives of the J. T. & K. W. R. R.

Page 84.

Nos. 1 to 6 were ordered by the Florida Construction Co., but were lettered J. T. & K. W. when built, the Construction Company being only the purchasing agent.

Nos. 12 and 13 were sold to the Atlantic & Western, and later became Florida East Coast first Nos. 18 and 19, respectively.

No. 23, B. L. W. No. 10402, became Plant System 807, and was later renumbered to A. C. L. Nos. 264 and 1264. Similarly, No. 24 became Plant System No. 806, and A. C. L. Nos. 263 and 1263.

No. 26 was built as a Vaucain compound, cylinders 11½" & 19"x24", and was subsequently changed to a simple engine with 18"x24" cylinders. Diameter of drivers, 67".

Locomotives of the S. S. O. & G.

Page 86.

Road & No.	Builder	C/N	Date	Type	Cyls.	DD	PS No.	SFW No.	ACL No.
SSO&G 1	Baldwin	7727	1885	4-4-0	16x24	63	802	236	559
SSO&G 2	Baldwin	9490	1888	4-4-0	16x24	63	801	235	557
SSO&G 3	Baldwin	11630	1891	4-4-0	16x24	63	803	237	558
x-SFW 47	Rogers	2950	1882	4-4-0	16x24	64	803	555-2nd	474
SSO&G 4	Baldwin	12051	1891	2-6-0	17x24	56	800	234	627
x-JTKW 16	Baldwin	8346	1887	4-6-0	18x24	54	804		260-1260
x-JTKW 17	Baldwin	8354	1887	4-6-0	18x24	54	805		261-1261
x-JTKW 23	Baldwin	10402	1889	4-6-0	18x24	54	807		264-1264
x-JTKW 24	Baldwin	10407	1889	4-6-0	18x24	54	806		263-1263

Note: #11630 may have been numbered S. F. & W. 105 for a short time.

Orange Belt Locomotives

Page 92.

No. 3 Was sold to the Dennis-Simmons Lbr. Co., and later to the Williamson & Brown Lbr. Co.

No. 4. (BLW 6660) went from the Orange Belt to the Norfolk, Albemarle & Atlantic; then to the Norfolk & Va. Beach No. 4; and finally to the Fosburgh Lumber Co. No. 6.

No. 5. Grant No. 1059, was built in 1873.

No. 8. Construction No. 1090.

No. 12. Renumbered A. C. L. 801, then 1801. Sold to the Sanford Mfg. Co., April 4th, 1912.

Locomotives of the Savannah, Florida & Western

Road & Number	Builder	C/N	Date	Type	Cyls.	DD	Renumbered to	ACL No.	1st	163	167	173	179
SFW 1	Baldwin	10746	1890	0-6-0	16x24	43		178; 2nd					
B&W 1	R. I.	2422	1890	0-6-0	16x24	43	B&W	400	1180				
SFW 2	Rogers	3998	1888	0-6-0	16x24	44½			1175				
C&S 2	Rogers	3659	1886	0-6-0	16x24	44½	SFW	29	174				
B&W 2	R. I.	2428	1890	2-6-0	17x24	56	B&W	401	653				
SFW 3	R. I.	2423	1890	2-6-0	17x24	56			649				
SFW 4	Rogers	3665	1886	0-6-0	16x24	44½			1176				
SFW 5	Rogers	3638	1886	4-4-0	17x24	64			504				
SFW 6	Rogers	3523	1884	4-4-0	16x24	64			550				
C&S 6	R. I.	2420	1890	0-6-0	16x24	43	C&S	301	1182				
SFW 7	Rogers	3639	1886	4-4-0	17x24	64			505				
C&S 7	R. I.	2421	1890	0-6-0	16x24	43	C&S	302	1181				
SFW 8	Rogers	3641	1886	4-4-0	17x24	64			506				
C&S 8	R. I.	2108	1888	4-4-0	17x24	61	C&S	303	528				
B&W 8	R. I.	2429	1890	2-6-0	17x24	56	B&W	402	654				
SFW 9	Rogers	3642	1886	4-4-0	17x24	64			507				
C&S 9	R. I.	2109	1888	4-4-0	17x24	64	C&S	304	529				
SFW 10	Rogers	3643	1886	4-4-0	17x24	64			508				
SFW 11	Baldwin	7652	1885	2-6-0	17x24	56			622				
B&W 11	Rogers	3992	1888	2-6-0	17x24	56	B&W	405	639				
SFW 12	Rogers	3644	1886	4-4-0	17x24	64			509				
C&S 12	R. I.	2128	1888	4-4-0	18x24	60	C&S	305	75				
B&W 12	Rogers	3993	1888	2-6-0	17x24	56	B&W	406	640				
SFW 13	Rogers	3526	1884	4-4-0	16x24	64			553				
C&S 13	Rogers	3515	1884	4-4-0	16x24	64	C&S	306	551				
B&W 13	Rogers	3994	1888	2-6-0	17x24	56	B&W	407	641-146				
C&S 14	Rogers	3516	1884	4-4-0	16x24	64	C&S	307	552				
SFW 14	Baldwin	7750	1885	4-4-0	17x24	62	JTKW	612	501				
SFW 14	Rogers	3649	1886	4-4-0	17x24	64	SFW	63	514				
SFW 14(?)	Rogers	4838	1893	4-6-0	19x24	72½	SFW	100	306				
B&W 14	Rogers	3977	1888	4-4-0	16x24	64	B&W	408	569-1477				
C&S 15	Rogers	3521	1884	4-4-0	16x24	64	C&S	308					
B&W 15	Rogers	3979	1888	4-4-0	16x24	64	B&W	409	570				
SFW 15	Rogers	4658	1892	0-6-0	16x24	44½							
SFW 16	Baldwin	5445	1881	0-6-0	16x24	43			170				
C&S 16	Baldwin	7655	1885	2-6-0	17x24	54	C&S	309	619				
B&W 16	Rogers	3981	1888	4-4-0	16x24	64	B&W	410	571				
SFW 17	Baldwin	7653	1885	2-6-0	17x24	54			609				
C&S 17	Baldwin	7658	1885	2-6-0	17x24	54	C&S	310	620				
B&W 17	Rogers	3982	1888	2-6-0	16x24	64	B&W	411	572				
SFW 17	Rogers	3999	1888	0-6-0	16x24	44½	SFW	70	1179				
SFW 18	Rogers	3650	1886	4-4-0	17x24	64			510				
C&S 18	Baldwin	7928	1886	4-4-0	17x24	61	C&S	311	503				
B&W 18	Rogers	4000	1888	0-6-0	16x24	44½	B&W	412	1177				
SFW 19	Baldwin	6612	1883	0-6-0	16x24	43			171				
C&S 19	Rogers	3637	1886	4-4-0	17x24	64	C&S	312	515				
B&W 19	R. I.	2110	1888	4-4-0	17x24	64	B&W	413	530				
SFW 20	Rogers	3651	1886	4-4-0	17x24	64			511				

Road & Number	Builder	C/N	Date	Type	Cyls.	DD	Renumbered to	ACL No.
C&S 20	Rogers	3653	1886	4-4-0	17x24	64	C&S	313 516
B&W 20	R. I.	2111	1888	4-4-0	17x24	64	B&W	414 531
SFW 21	Baldwin	7654	1885	2-6-0	17x24	54		621
SFW 21	R. I.	2123	1888	2-6-0	17x24	54	SF	238 642
C&S 21	Rogers	3660	1886	2-6-0	17x24	56	C&S	314 623-142
SFW 22	R. I.	2124	1888	2-6-0	17x24	54	SF	239 643
C&S 22	Rogers	3661	1886	2-6-0	17x24	56	C&S	315 624-140
SFW 23	Rogers	3652	1886	4-4-0	17x24	64		512
C&S 23	Rogers	3662	1886	2-6-0	17x24	56	C&S	316 625-141
B&W 23	R. I.	2125	1888	2-6-0	17x24	54	B&W	415 646
SFW 24	R. I.	1730	1886	4-6-0	17x24	54	ex-W&A	58 256
C&S 24	Rogers	3664	1886	2-6-0	17x24	56	C&S	317 626
B&W 24	R. I.	2126	1888	2-6-0	17x24	54	B&W	416 647
SFW 25	R. I.	1731	1886	4-6-0	17x24	54	ex-W&A	59 257
C&S 25	Rogers	3658	1886	0-6-0	16x24	44½	C&S	318 172
B&W 25	R. I.	2127	1888	2-6-0	17x24	54	B&W	417 648
SFW 26	Rogers	3636	1886	4-4-0	17x24	64		513
C&S 26	R. I.	2121	1888	2-6-0	17x24	54	C&S	319 635
B&W 26	R. I.	2430	1890	2-6-0	17x24	54	B&W	404 655
C&S 27	R. I.	2122	1888	2-6-0	17x24	54	C&S	320 644
B&W 27	R. I.	2431	1890	2-6-0	17x24	54	B&W	418 656
SFW 28	Rogers	2700	1881	4-4-0	15x24	64	GPW&B	1 437
SFW 28	Baldwin	7923	1886	4-4-0	17x24	62		502
SFW 29	Rogers	2701	1881	4-4-0	15x24	64	GPW&B	2 438
29	Rogers	3659	1886	0-6-0	16x24	44½	ex-C&S	2 174
30	Rogers	2704	1881	4-4-0	15x24	64	no data	
30	Rogers	3663	1886	0-6-0	16x24	44½		1st 173
31	Rogers	2725	1881	2-6-0	16x24	56		
32	Baldwin	5447	1881	0-6-0	16x24	43	To F.S.	32 1178
33	Baldwin	5477	1881	4-4-0	17x24	61		499
34	Baldwin	5480	1881	4-4-0	17x24	61		500
35	Baldwin	6618	1883	2-6-0	17x24	54		610
36	Baldwin	6648	1883	2-6-0	17x24	54	To F.S.	36 611
37	Rogers	2855	1881	2-6-0	16x24	56	To F.S.	37 601
38	Rogers	2857	1881	2-6-0	16x24	56	To F.S.	38 602
39	Rogers	2853	1881	4-4-0	15x24	64		
40	Rogers	2854	1881	4-4-0	15x24	64		439

Engines bearing shop numbers 2949 to 2956 are shown in Rogers records as S. F. & W. Nos. 40 to 47, respectively. A. C. L. records indicate that such was not the case. Data shown herewith are in accord with A. C. L. records as regards the locomotives received by them from the S. F. & W. There seems to be no existing records of Nos. 2952, 2955 and 2956, and these numbers have been arbitrarily assigned to Nos. 44, 41 and 42. Disposition of Nos. 41 and 42, after their transfer to the Florida Southern, is not of record at this time.

40	Rogers	2949	1882	4-4-0	16x24	64	To F.S.	40
41	Rogers	2955?	1882	4-4-0	16x24	64	To F.S.	41
41	Rogers	3971	1888	4-4-0	16x24	64		554
42	Rogers	2956?	1882	4-4-0	16x24	64	To F.S.	42
43	Rogers	2951	1882	4-4-0	16x24	64	To F.S.	43 475
44	Rogers	2952?	1882	4-4-0	16x24	64	To F.S.	44 476
45	Rogers	2953	1882	4-4-0	16x24	64	To F.S.	45 472
46	Rogers	2954	1882	4-4-0	16x24	64	To F.S.	46 473-1473

Road & Number	Builder	C/N	Date	Type	Cyls.	DD	Renumbered to	ACL No.	Road Number
47	Rogers	2950	1882	4-4-0	16x24	64	SSO&G	803	555-2nd 474
48	Rogers	3972	1888	4-4-0	16x24	64			556-1472
49	Rogers	2957	1882	4-4-0	16x24	64			607-(To 0-64, 143-194)
50	Rogers	2958	1882	4-4-0	16x24	64			608-600
51	Baldwin	6647	1883	2-6-0	17x24	56			612
52	Baldwin	6679	1883	2-6-0	17x24	56			613
53	Baldwin	6684	1883	2-6-0	17x24	56			614
54	Baldwin	6717	1883	2-6-0	17x24	56	To F.S.	54	615
55	Baldwin	6718	1883	2-6-0	17x24	56			616
56	Baldwin	6736	1883	2-6-0	17x24	56			617
57	Baldwin	6734	1883	2-6-0	17x24	56			618
58	Baldwin	6497	1882	4-4-0	17x24	61			470
59	Baldwin	6503	1882	4-4-0	17x24	61			471
60	Baldwin	6508	1882	4-4-0	17x24	61			467
61	Baldwin	6576	1883	4-4-0	17x24	61			468
62	Baldwin	6574	1883	4-4-0	17x24	61			469
63	Rogers	3649	1886	4-4-0	17x24	64	From 3rd	14	514
64	R. I.	1827	1887	2-6-0	17x24	56			644
65	R. I.	1828	1887	2-6-0	17x24	56			628
66	R. I.	1829	1887	4-4-0	17x24	63			517
67	R. I.	1830	1887	4-4-0	17x24	63			518
68	R. I.	1831	1887	4-4-0	17x24	63			519
69	No data								
70	Rogers	3999	1888	0-6-0	16x24	44½	From 4th	17	1179
71	R. I.	2112	1888	2-6-0	17x24	56	To F.S.	705	636
72	R. I.	2113	1888	2-6-0	17x24	56			629
73	R. I.	2114	1888	2-6-0	17x24	56			630
74	R. I.	2115	1888	2-6-0	17x24	56			631
75	R. I.	2116	1888	2-6-0	17x24	56	To F.S.	706	637
76	R. I.	2117	1888	2-6-0	17x24	56	To F.S.	707	638
77	R. I.	2118	1888	2-6-0	17x24	56			632
78	R. I.	2119	1888	2-6-0	17x24	56			633
79	R. I.	2120	1888	2-6-0	17x24	56			634
80	R. I.	2129	1888	4-4-0	17x24	73			76
81	R. I.	2424	1890	2-6-0	17x24	56	To F.S.	708	657
82	R. I.	2425	1890	2-6-0	17x24	56			650
83	R. I.	2426	1890	2-6-0	17x24	56			651
84	R. I.	2616	1890	0-6-0	16x24	43			1186
85	R. I.	2417	1890	0-6-0	16x24	43			1185
86	R. I.	2418	1890	0-6-0	16x24	43			1184
87	R. I.	2419	1890	0-6-0	16x24	43			1183
88	R. I.	2427	1890	2-6-0	17x24	56			652
89	Rogers	4659	1892	0-6-0	16x24	44½			1189
90	Rogers	4660	1892	0-6-0	16x24	44½			1188
91	Rogers	4661	1892	0-6-0	16x24	44½			1187
92	Rogers	4669	1892	2-6-0	18x24	56			664
93	Rogers	4670	1892	2-6-0	18x24	56	To S.F.	30	663
100	Rogers	4838	1893	4-6-0	19x24	72½	From SFW	14	306
101	Rogers	5054	1895	4-6-0	19x24	69			307
102	Rogers	5091	1895	4-6-0	19x24	69			308
103	Rogers	5090	1895	4-6-0	19x24	69			309
104	R. I.	2912	1893	4-6-2	19x26	72	x-CMSP	828	287-1287
105	R. I.	2880	1893	4-6-2	19x26	72	x-CMSP	830	288-1288
106	R. I.	2913	1893	4-6-2	19x26	72	x-CMSP	829	289-1289
107	R. I.	3222	1900	4-6-0	19x28	73			271-207

Road & Number	Builder	C/N	Date	Type	Cyls.	DD	Renumbered to	ACL No.
108	R. I.	3223	1900	4-6-0	19x28	73		270-206
109	R. I.	3224	1900	4-6-0	19x28	73		272-208
110	R. I.	3225	1900	4-6-0	19x28	73		273-209
111	R. I.	3226	1900	4-6-0	19x28	73		274-210
112	R. I.	3227	1900	4-6-0	19x28	73		290-1290
113	R. I.	3228	1900	4-6-0	19x28	73		291-1291
114	R. I.	3229	1900	4-6-0	19x28	73		292-1292
115	R. I.	3230	1900	4-6-0	19x28	73		293-1293
116	R. I.	3231	1900	4-6-0	19x28	73		294-1294
117	R. I.	3232	1900	4-6-0	19x28	73		295-1295
118	Baldwin	20040	1902	4-6-0	19x28	72		275-211
119	Baldwin	20000	1902	4-6-0	15&25x26	73	See Note	
120	Richmond	3290	1901	0-6-0	18x26	44		123
121	Richmond	3291	1901	0-6-0	18x26	44		121
122	Richmond	3292	1901	0-6-0	18x26	44		122

Notes on S. F. & W. Locomotives

Locomotives 104, 105 and 106, of the S. F. & W., present an interesting case of differences between "official" records obtained from different sources.

These three engines were built by the Rhode Island Works, in 1893, as Nos. 828, 830 and 829, respectively, for the C. M. & St. P. They left the locomotive plant as 4-6-2's, trailing trucks having been added in order to reduce the weight on the number three drivers, which exceeded the limit of the purchasing road. The engines had cross-compound cylinders, 21" and 36"x26", and 78" diameter driving wheels. Since the name "Pacific" type had not then been adopted for the 4-6-2 wheel arrangement, the engines were described as "ten-wheelers with trailing trucks."

They were later returned to the builders, by the railroad company, where, according to the *Rhode Island Company records*, the trailing trucks were removed, and the compound cylinders replaced with 20"x26" simple cylinders. These records make no mention of substituting smaller drivers, but specifically indicate that, when sold to the S. F. & W., they left the Rhode Island plant as 4-6-0's.

However, and here is where the records conflict, Mr. Wilson E. Symons, who was S. M. P. for the Atlantic Coast Line in 1902, wrote an article about these engines, which appeared in *Railway & Locomotive Engineering*, for June, 1925, in which he stated that the engines in question were purchased from the Rhode Island Company by the S. F. & W., in 1900, and were of the 4-6-2 wheel arrangement at that time, and so remained until 1912, when the trailers were removed by the A. C. L.

Mr. Symons further states that their cylinders were 19"x26", not 20"x26", as shown in the R. I. records.

In support of Mr. Symons' statement as to the type and 19" cylinders, A. C. L. reports, listing their locomotives by groups, show the three Pacifics with 19"x26" cylinders and 72" drivers. In May, 1912, upon removal of the trailing truck, they were added to a group of 19" ten-

wheelers. They were numbered 287, 288 and 289, as Pacific types on the A. C. L., and were renumbered to 1287, 1288 and 1289, after being converted to ten-wheelers. By 1923, the cylinders had been changed to 20"x26". These 4-6-0's had the remarkable ratio of adhesion of 6.55.

Plant System No. 119, the first Baldwin four-cylinder balanced compound, was not accepted by the S. F. & W. It was subsequently sold to the Chicago Short line, their No. 1, who later sold it to the Southern Iron & Equipment Co., after which, in 1912, it was sold to the A. B. & A., their Nos. 1, 99 and 39, in that order, and sold to the Joseph Iron Co., in August, 1920.

The two locomotives shown in Bulletin No. 86 as ex-W. C. & A. Nos. 10 and 11 were never S. F. & W. equipment, but were successively W. C. & A. Nos. 10-11, 73-74, A. C. L. Nos. 598-599, 102-103, and finally second 607-608.

Standard gauge engines of the South Florida R. R., which came to the S. F. & W., were renumbered into that road's 200 series below 240, and are shown in the roster of the S. F., together with their A. C. L. numbers.

Additional data on Florida East Coast Locomotives

<i>Number</i>	<i>Data.</i>
1st 5	Ex-St. Johns Ry. No. 5, B. L. W. No. 8322, was renumbered to 9.
1st 7	Scrapped in March, 1889.
8	Ex-B. S. O. C. & A. No. 1, was received from the Atlantic & Western, road number unknown, and was sold in August, 1914, to D. J. Coughlin, and later to the Burton-Swartz Cypress Co.
9	Renumbered from 1st No. 5. Sold to Cashen & McGuire, July, 1903.
2nd 13	There was a second engine of this number, about which there is no available information.
1st 16	Was renumbered to 2nd No. 18, and was sold to the South Georgia, in 1916.
17	Was renumbered to 2nd No. 19, and was sold to the Warner Sugar Refining Co., in July, 1917.
1st 18	Was originally No. 1, A. C. St. J. & I. R., Cooke No. 1645. It was received from the A. & W., No. 4, and was sold to J. T. & R. Boone, in 1899.
1st 19	Was originally No. 2, A. C. St. J. & I. R., Cooke No. 1646. It was received from the A. & W., number unknown. Sold to R. H. Hanley, Feb. 1906.

Locomotives of the Georgia Southern & Florida

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Note: First Nos. 101 to 111 and 120 to 126 were received as Nos. 1 to 11 and 20 to 26, respectively, and were lettered G. S. & F. when built. Second No. 100 was received as No. 27.

SSF	No.	Builder	C/N	Date	Type	Cyls.	So. Ry. DD No.	Remarks
	100	R. I.			4-4-0	17x24		
	100	R. I.	2240	1889	0-6-0	17x24	50	ex-27. Sold 1916.
	101	R. I.	1854	1887	4-4-0	17x24	62	Exchanged 11-3-97 for #150.
	101	Baldwin	16564	1899	0-6-0	18x24	50	ex-AV&W #301. Sold 1916.
	102	R. I.	1855	1887	4-4-0	17x24	56	ex-2. Exch. 11-3-97 for M&B #221. (First #133, GS&F)
	102	Baldwin	18093	1900	0-6-0	18x24	50	ex-AV&W 302. Sold 1916.
	103	R. I.	2035	1888	4-4-0	17x24	62	ex-3. Sold 1916, H.&F.S. Ry.
	104	R. I.	2058	1888	4-4-0	17x24	56	ex-4. Sold 1900.
	105	R. I.	2077	1889	4-4-0	18x24	56	ex-5. Trf'd to M&B #201.
	106	R. I.	2078	1889	4-4-0	18x24	56	ex-6. Trf'd to M&B #202.
	107	R. I.	2241	1889	4-4-0	18x24	56	ex-7. Sold 1911.
	108	R. I.	2242	1889	4-4-0	18x24	56	ex-8. Sold 1911.
	109	R. I.	2243	1889	4-4-0	18x24	56	ex-9. Sc. 1912.
	110	R. I.	2244	1889	4-4-0	18x24	56	ex-10. Sold 1914, M&B #2.
	111	R. I.	2245	1889	4-4-0	18x24	56	ex-11. Dest'd in wreck, 2-14-10.
	112	R. I.	2266	1890	4-4-0	18x24	56	Sold 1912.
	113	R. I.	2267	1890	4-4-0	18x24	56	Sold 1911.
	114	R. I.	2268	1890	4-4-0	18x24	62	To 2nd #115.
	115	R. I.	2269	1890	4-4-0	18x24	56	Sold 1912.
	115	R. I.	2268	1890	4-4-0	18x24	62	From #114.
	116	Baldwin	16305	1898	4-4-0	18x24	56	8200 ex-AV&W #200. Sc. Macon, 3-9-32.
	117	Baldwin	16306	1898	4-4-0	18x24	56	8201 ex-AV&W #201. Sc. Macon, 9-22-28.
	118	Baldwin	17830	1900	4-4-0	18x24	56	8202 ex-AV&W #202 Sc. Macon, 2-13-32.
	119	Richmond	3318	1901	4-4-0	18x24	56	ex-VS&P 312-302.
	120	R. I.	2032	1888	4-6-0	18x24	49	ex-20. Note 1.
	121	R. I.	2033	1888	4-6-0	18x24	49	ex-21. Note 2.
	122	R. I.	2056	1888	4-6-0	18x24	49	ex-22. Note 3.
	123	R. I.	2057	1888	4-6-0	18x24	49	ex-23. Note 4.
	124	R. I.	2132	1889	4-6-0	18x24	49	ex-24. Note 5.
	125	R. I.	2133	1889	4-6-0	18x24	49	ex-25. Note 6.
	126	R. I.	2134	1889	4-6-0	18x24	49	ex-26. Note 7.
	127	R. I.	2260	1890	4-6-0	18x24	49	Sold 1911.
	128	R. I.	2261	1890	4-6-0	18x24	49	Sold 1911.
	129	R. I.	2262	1890	4-6-0	18x24	49	Sold 1911.
	130	R. I.	2263	1890	4-6-0	18x24	49	Sc. 1916.
	131	R. I.	2361	1890	4-6-0	18x24	49	ex-M&B #220. Sold 1912.
	132	R. I.	2524	1890	4-6-0	18x24	49	Sold 1912, to L. O. P. & G. Co. Lettered S. L. Co. #62.
	133	R. I.	2362	1890	4-6-0	18x24	49	ex-M&B #221. Returned to M&B #221.
	133	R. I.	2363	1890	4-6-0	18x24	49	ex-B&B #222. Gone by 1916.
	134	R. I.	2364	1890	4-6-0	18x24	49	ex-M&B #223. Sold 1906, to H.&S.F.
	135	Schenect	29289	1903	4-6-0	20x26	56	8300 Sc. Hayne, 3-24-39.
	136	Schenect	5553	1900	4-6-0	20x26	56	8301 Sc. Macon, 12-30-36.
	137	Schenect	5554	1900	4-6-0	20x26	56	8302 To Sou. #3458, 1-1939.
	138	Schenect	5555	1900	4-6-0	20x26	56	8303 Sc. Macon, 9-22-28.
	139	Baldwin	20566	1902	4-6-0	20x26	56	8304 Sold Blue Ridge Ry. #8, 1-1939.
	140	Baldwin	23674	1904	4-6-0	20x26	56	8305 Sc. Macon, 8-1929.
	141	Baldwin	15772	1898	4-6-0	18x24	49	ex-AV&W #100. Note 8.

GSF No.	Builder	C/N	Date	Type	Cyls.	So. Ry. DD No.	Remarks
142	Baldwin	16246	1898	4-6-0	18x24	56	ex-AV&W #101. Note 9.
143	Baldwin	17941	1899	4-6-0	18x24	56	ex-AV&W #102. Note 10.
150	R. I.	2526	1890	0-6-0	18x24	44	Sold 1915, to M. & B.
151	Schenect.	5556	1900	4-4-0	19x26	62 8210	
152	Schenect.	5776	1901	4-4-0	19x26	62 8211	
153	Schenect.	5777	1901	4-4-0	19x26	62 8212	
154	Schenect.	5778	1901	4-4-0	19x26	62 8213	
155	Baldwin	27116	1905	4-6-0	20x26	70 1036	
156	Baldwin	27117	1905	4-6-0	20x26	70 1037	
157	Baldwin	27182	1905	4-6-0	20x26	70 1038	
158	Baldwin	29708	1906	4-6-0	20x26	70 1039	
159	Baldwin	29747	1906	4-6-0	20x26	70 1040	
160	Baldwin	29748	1906	4-6-0	20x26	70 8230	
161	Baldwin	29788	1906	4-6-0	20x26	70 8231	
162	Baldwin	29856	1906	4-6-0	20x26	70 8232	
163	Baldwin	29857	1906	4-6-0	20x26	70 8233	
175-180	Baldwin	41386-91	1914	4-6-0	21x28	69 8250-8255	
181-182	Baldwin	42701-2	1916	4-6-0	21x28	69 8256-8257	
200-201	Baldwin	35447-48	1910	0-6-0	20x26	51 8370-8371	
202-205	Richmond	52310-13	1912	0-6-0	20x26	51 8372-8375	
300-301	Baldwin	33693-94	1909	2-8-0	21x28	63 553-554	
302-303	Baldwin	33728-29	1909	2-8-0	21x28	63 555-556	
400-403	Baldwin	35421-24	1910	2-8-0	22x30	57 8330-8333	
404-408	Baldwin	35442-46	1910	2-8-0	22x30	57 8334-8338	
409-414	Richmond	52324-29	1912	2-8-0	24x30	57 8339-8344	
500	Baldwin	34780	1910	4-6-2	22x28	72½ 1360	
501	Baldwin	34858	1910	4-6-2	22x28	72½ 1361	
502-505	Baldwin	35388-91	1910	4-6-2	22x28	72½ 1362-1365	

Roster Notes. G. S. & F. Locomotives

1. No. 120 sold to Georgia Car & Locomotive Co., 1911. Became Gulf Line Ry. No. 35, 1911.
2. No. 121 sold to Georgia Car & Locomotive Co., 1911. To Upchurch Co. No. 10, 1911.
3. No. 122 scrapped at Macon, Sept. 1911.
4. No. 123 sold to G. C. & L. Co., 1911. To Dowling-Shans Lbr. Co. No. 174, 1911.
5. No. 124 sold to G. C. & L. Co., 1911.
6. No. 125 sold to G. C. & L. Co., 1910. To G. F. & A. No. 153, 1910.
7. No. 126 sold to Hawkinsville & Florida Southern No. 36, 1911.
8. No. 141 sold to East Coast Lumber Co., No. 341, March, 1916.
9. No. 142 sold to Ocilla Southern No. 51, November, 1915.
10. No. 143 sold to East Coast Lumber Co., March, 1916.
Initials M. & B. are for Macon and Birmingham; H. & F. S. for Hawkinsville & Florida Southern; A. V. & W. for Atlantic, Valdosta & Western.

The known locomotives of two small railroads, not separately listed in Bulletin No. 86, are shown herewith.

Locomotives of the Blue Springs, Orange City & Atlantic

No.	Builder	C/N	Date	Type	Cyls.	DD	Disposition
1	Baldwin	7684	1885	4-4-0	17x24	63	Sold to the A. & W. Later became F. E. C. #8. Sold, August, 1914.
2	Baldwin	7750	1885	4-4-0	17x24	63	Became J. T. & K. W. #14; then S. F. & W. #612 and A. C. L. #501. Scrapped May 11th, 1917.

Locomotives of the Atlantic Coast, St. Johns & Indian River

No.	Builder	C/N	Date	Type	Cyls.	DD	Disposition
1	Cooke	1645	1885	4-4-0	14x22	60	To J. T. & K. W. #12; then to A. & W. #4; to F. E. C. first #18. Sold in 1899.
2	Cooke	1646	1885	4-4-0	14x22	60	To J. T. & K. W. #13; then to A. & W., to F. E. C. first #19. Sold Feb. 19th, 1906.

The New Jersey Railroad and Transportation Company

BY LESLIE E. FREEMAN, JR.

A thesis submitted by the author to Princeton University Department of History, in April, 1950, and from which thesis the chapter on "Conclusions" and a comprehensive bibliography have been omitted because of limitations of bulletin space.

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The original thesis is thoroughly documented and includes a detailed bibliography, a resume of which shows contemporaneous newspapers, Acts of the New Jersey General Assembly, annual reports of the Directors of the N. J. R. R. & T. Co., pamphlets and sundry reports on various committees, both legislative and public, and approximately two dozen books and periodicals, to each of which due acknowledgement is made. (Editor).

CHAPTER ONE

New Jersey Follows The Trend Toward Internal Improvements

Few passengers, who ride the mainline of the Pennsylvania Railroad across the Jersey Meadows toward Newark, New Brunswick, Trenton and Philadelphia, are aware that they are riding over the route of the New Jersey Railroad and Transportation Company. This railroad, originally advocated by the citizens of northern New Jersey, was finally constructed after a prolonged and desperate struggle with one of the strongest and most unscrupulous monopolies in the United States. The history of the difficulties that the early backers of the New Jersey Company had to overcome before securing a charter for the road, the physical problems encountered in the construction of right-of-way, and the development of this early railroad into an integral link in the nation's transportation system can best be described by outlining the conditions of travel during this early period, and then briefly describing the struggle which the promoters of the road had with the Monopolists.

It is difficult to conceive, in this era of rapid transportation, that travel in the eighteenth and nineteenth centuries laid the foundations for the large streams of passengers and freight that now cross New Jersey daily; but the heavy traffic of the mid-twentieth century had its counterpart in the earlier years. Both the geographic position and the geology of New Jersey have favored the State, since the early 1700's. Its position between the large cities of New York and Philadelphia gave New Jersey an early lead in the field of travel. The State also benefited

from its low rolling topography, which favored the early modes of transportation, both land and water, and soon the State possessed travel facilities superior to the rest of the nation.

The first travelers across New Jersey followed the old high road between New York and Philadelphia, which ran from Bordentown, on the Delaware River, to Perth Amboy, on Raritan Bay. "Along this royal highway passed all the early travel between the New England Colonies and those south and west of the Delaware and the Potomac." The highway itself was protected at various points by blockhouses and garrisons of British colonial troops. Travel along this route was far from comfortable and was very slow and tedious. Benjamin Franklin traversed this road as a boy, in 1723. His account of this journey, in his "Autobiography," tells of a six-day trip between New York and Philadelphia. In crossing New York Bay, the boat was caught in a storm and driven onto the Long Island shore, finally reaching Amboy after "having been thirty hours on the water, without victuals, or any drink" The next leg of his journey saw Franklin drenched by continuous rain and, on the final leg of his journey, young Ben missed the regular bi-weekly boat and was forced to row all the way to Philadelphia."

It is quite evident, from Franklin's description, that travel in the colonies was far from comfortable, and "so far as possible, the early colonist used water transportation." New Jersey was most fortunate to be favored by natural water routes. The State was bounded by both the Delaware and the Hudson Rivers and was crossed by a natural system of navigable streams so effectively that no point within the State was more than twenty-five miles from a water route. As the popularity of water transportation increased, New Jersey's early towns began to develop beside important navigable waters.

Prior to the growth of water travel, stage coaches were the principal mode of travel across the State, taking anywhere from three to five days to make the journey from New York to Philadelphia. By 1773, with the benefit of greatly improved roads, the stages were making the journey in a day and a half and charging a four dollar fare. The turn of the century saw the beginning of the real stage coach era, with service much improved over that of the erratic Revolutionary period. In 1829, stages alone were carrying 2000 passengers a week across New Jersey. Despite this better service on both land and sea, the citizens began to demand improved transportation, both interstate and intrastate.

Ever since the early 1800's, the people of the country had shown more and more interest in internal improvements. This initial movement was hampered by both the lack of available capital and the necessary technical skills. "The country was new, the demands for capital . . . were great, banking facilities few, and credit was in its infancy." There was not a single established technical school in the entire country and "except for a score of men—all of them born on the other side of the ocean—there was no mechanical skill anywhere" In an effort to rid this country of its inadequate system of internal communication, Albert Gallatin brought forth his famous plea for federal aid to develop adequate transportation facilities within the United States.

Gallatin's forceful pleas led to a Congressional request that he prepare a report of what means Congress had within its power for "the purposes of opening roads and making canals." In April, 1808, Albert Gallatin submitted his renowned "Report to the Secretary of the Treasury on the Subject of Public Roads and Canals," in which he proposed federal aid of nearly twenty million dollars for the construction of a system of canals and adjoining roads along the Atlantic Coast, connecting the seaboard with the Mississippi Valley and the Saint Lawrence River.

Gallatin's plans were never carried out, but his ideas were instrumental in encouraging various bodies to undertake internal improvements. The Federal Government, however, did allot funds for the construction of the National Road. The State of New York with its own funds built the Erie Canal, connecting the Great Lakes with the port of New York. "The Erie Canal stands out from all others of that period in its influence on building up . . . the East." Immediately, other states began to take steps to improve their system of internal communications.

New Jersey's important position demanded that she take prompt steps to keep pace with the rapidly growing, nation-wide movement of turnpikes and canals. New Jersey was fortunate to have Colonel John Stevens as one of its foremost citizens. Colonel Stevens was among the first advocates of railroads in the United States. As early as 1812, he had proposed "a railway of timber" between two points in New York State, but lack of financial support forced him to abandon the project. A little later, the legislators of New Jersey, in an effort to place their State as one of the leaders in the growing field of internal transportation, studied the possibility of a railroad connecting the Hudson with the Delaware River. The legislators were further encouraged on the projected rail line, when the Baltimore and Ohio Railroad successfully commenced operations in Maryland, early in 1828.

The railroad advocates in the Legislature, who were led by Colonel Stevens, soon found serious opposition to the proposed railroad. A large group in Trenton maintained that a canal, not a railroad, was the obvious answer to the demand for improved transportation. Both the canal and rail interests organized strong lobbies and feeling ran high. Fortunately for the State a compromise was worked out between the two factions, and on February 4, 1830, charters were granted to both the Delaware and Raritan Canal Company and the Camden and Amboy Railroad Company. Thus, the canal and railroad eras in New Jersey began simultaneously, and New Jersey was on her way toward becoming one of the leaders in the field of transportation.

It is interesting to note that New Jersey was alone in trusting its internal improvements to incorporated companies. The other states followed New York and constructed their new transportation projects with state bond issues, thereby adding a substantial burden to their rapidly growing indebtedness. The period following the Panic of 1837 intensified the pressure on the state treasuries and many of the states suffered large financial losses. As Commodore Richard Stockton, a New Jersey politician, pointed out in a defense of the New Jersey system of

issuing construction rights to corporations, "The experience of several states in the management of railroads and canals has proven that politicians could not do as well for the state with public works as they could do for themselves . . . Had New York, Pennsylvania, Ohio, Virginia and Indiana adopted the policies of New Jersey, they would not have been the scenes of such stupendous profligacy as have characterized their legislatures . . ."

Regardless of what methods the several states used in building their respective internal improvements, they were all openly in "revolt against the nationalistic trend which followed the War of 1812." In an effort to reassert their own rights and to extend their scopes of individual sovereignties against the encroaching federal power, the states granted various privileges to private interests merely as a manifestation of their own State rights. An outgrowth of these attempts to exert what they believed to be their sole rights was the issuance of broad monopoly grants by the State to corporations.

The New Jersey Legislature granted its first such monopoly to the newly formed Joint Companies. This corporation resulted from the merger of the Delaware and Raritan Canal and the Camden and Amboy Railroad, in an effort to prevent the two companies, whose routes both ran from New York to Philadelphia, from engaging in ruinous competition. Under the "Union" or "Marriage Act," as the merger act was commonly called, passed on February 15, 1831, both corporations maintained their own organizations and officers, but placed their stock on an equal basis, and managed their corporate affairs sitting as a joint board. Hence the name, the Joint Companies.

Despite the numerous advantages of monopolistic system of developing internal improvements over the various methods used by the other states, the geographical position of New Jersey necessitated some type of control over any monopoly powers granted by the State. The failure of New Jersey to restrict the combined power of the Camden and Amboy and the Delaware and Raritan Canal soon allowed the leaders of these two companies to dominate the Legislature. Throughout the United States, the State of New Jersey became known as "The Camden and Amboy State." It soon became quite obvious that the State's effort to extend its sovereign power was being abused by the Joint Companies, which were under the control of the Stockton family, of Princeton, and the Stevens, of Hoboken. The original privileges extended to these two corporations were not out of line with those granted to various interests in other states. However, the Camden and Amboy quietly built up a very powerful lobby, which was instrumental in extending the power of the Joint Companies, in Trenton.

While the Joint Companies were consolidating their power in the capital, the people of northern Jersey had not been idle. As early as January, 1831, a group of Newark citizens had met to discuss the proposed Atlantic Railroad Bill, in an effort to determine what benefits the town of Newark might receive from this contemplated road. After a detailed study of the pending bill, the group passed resolutions in favor of a railroad from the Hudson to the Delaware River, and ap-

pointed a committee to journey to Trenton to petition in favor of this internal improvement for their section of the State.

Even in January, 1831, although the "Marriage Act" merging the Camden and Amboy and the Delaware and Raritan Canal had not been passed, the power of these two companies was beginning to be felt in the Legislature. Their united opposition to all railroad or canal bills brought before either house, at the capital, resulted in the tabling of the Atlantic Railroad bill. The Camden and Amboy so strenuously opposed this railroad from the Hudson to the Delaware, because it might have become a rival of their New York-Philadelphia route, that all efforts of the Newark committee to secure the passage of the act were in vain. This initial defeat did not deter the ambitious citizens of Newark; so, early in February, they reconvened in Newark to discuss possible methods of combating the opposition at Trenton. During the February meeting, it was decided to make an all out effort to secure the passage of the Atlantic Bill and the committee even declined to support a recently proposed bill, which advocated the chartering of a railroad from Newark to Hoboken, in order to concentrate their efforts on the Atlantic Bill.

In the face of the growing opposition from the Newark committee and other northern citizens organizations, the Camden and Amboy promptly took radical measures to enhance its power in Trenton and to prevent the chartering of a rival railroad. In an attempt to insure itself a monopoly of all New York-Philadelphia through traffic, the Camden and Amboy Railroad proposed to give the State of New Jersey one thousand shares of its stock outright and the right to have the governor appoint one of the railroad's directors. In return for this gift of the Camden and Amboy stock, which had a value of at least a hundred thousand dollars, the State only had to promise that it would not permit another railroad to be constructed from New York to Philadelphia, but, if the Legislature should ever authorize another through railroad, the capital stock was to automatically revert to the Camden and Amboy. This act, which was obviously intended "to insure a monopoly of traffic, through the reluctance of any future legislation to forfeit stock with a nominal value of a \$100,000," received the approval of the Legislature during January, 1831, along with the previously mentioned "Marriage Act."

With their strength in Trenton steadily growing, the Joint Companies managed to keep the Atlantic Railroad Bill successfully postponed. In December, the Joint Companies brought forth their biggest effort to enlarge their monopoly powers, by introducing an act known as the Subscription Bill. The proposed Bill immediately invoked the ire of the northern part of the State, which had not forgotten the treatment that the Atlantic Bill had received in Trenton. The newspapers of both the northern and southern parts of the State exchanged heated debates in their columns—the north opposing the Bill, the south strongly supporting it.

The main provisions of the proposed Subscription Bill permitted the State to subscribe to one-quarter of the capital stock of the Joint Companies. The funds to purchase the stock were to come from a

special School Fund, which had been created by the State to aid public schools. In return for the right to purchase the stock at a discount, the Legislature was to permanently sanction the earlier monopoly over the New York-Philadelphia traffic.

The *Jersey Journal*, of Elizabeth, and the *Trenton Times* took great pleasure in supporting their respective causes and exposing their opponents arguments on the highly controversial bill. From the columns of these two papers it is possible to derive a clear picture of the battle between the Monopolists and the citizens of north Jersey, who maintained they were being deprived of their share of the internal improvements. The *Emporium* touched off the feud on December 17, 1831, when it stated that the Subscription Bill was generally misunderstood in the north, because it was definitely "friendly to internal improvements and is anxious to promote the public interest."

The northern papers realized that the Joint Companies were behind the Bill and, if it were passed, the possibilities of their section of the State receiving adequate transportation would have been endangered. Despite the obvious indications that the monopoly interests were behind the act, the *Emporium* steadfastly maintained that the bill originated with the proper officers of the government.

The *Jersey Journal* was up in arms over the proposal that the School Fund capital should be used for a speculative investment. In answer to this protest, the Trenton paper held it was foolish to allow the fund to remain idle, and it would be impossible to make such a fine investment elsewhere, except at a premium of from 10% to 30%. Besides, the *Emporium* concluded that, if the money invested in the Joint Companies' stock did not earn at least 5%, the Subscription Bill "is null and void." In its January 10, 1832 issue, the *Journal* refutes the argument that the School Fund investment is sound, maintaining that it was very poor policy to invest the public's money in an unfinished and untested concern.

Continuing its attack on the Bill, the *Jersey Journal* claimed that even the loose wording of the act was a disgrace to the proper methods of government. Many of the statements in the act were contradictory and even entire sections were totally repugnant to each other. The *Journal* then proceeded to demand that the entire bill be rewritten, to clear up the numerous existing conflicts, before it was acted upon by the Legislature.

The uproar created by the *Journal* and other periodicals kept the northern citizens continually voicing their protests against the bill which would probably deprive their section of the advantages of a railroad. On January 12, 1832, at an Essex County meeting, the people vigorously deprecated the Joint Companies and "unanimously resolved, that in the opinion of the meeting, it is highly inexpedient for the State at this time, to subscribe for any part of the . . . Stock."

The protest over the proposed Subscription Bill continued in the papers, as the *Newark Monitor* entered the battle and urged that the denizens of Newark continue their determined opposition to counteract "the monopolizing schemes of a company, whose influences have been exerted against this county as well as the good of the State."

The effect of the northern protests seemed to fall upon deaf ears, as the proponents of the measure maintained the upper hand in Trenton. Suddenly the monopoly interests pulled what the *Jersey Journal* termed to be worst in a long series of outrages perpetrated by them, when the Monopolists forced the discharge of a Legislative Committee. This latest dispute between the two groups in Trenton centered around a Financial Report submitted to the State Treasurer by the Canal Company. Certain expenditures such as—"timber, cement, and iron \$76,036.56"; "contingent expenses \$4,587.29"; and "cash advanced to the Camden and Amboy," were brought to light by the anti-Monopolists, during the debate on the Subscription Bill. In an effort to prove that the Joint Companies were an ill-managed and corrupt organization, and a poor concern in which to invest the State School Fund, the northern delegations in Trenton demanded that the State appoint a committee to examine into the affairs of the two companies. After a lengthy debate, the legislators finally named a committee of three from their numbers to determine whether or not the Joint Company was a reliable corporation and a sound investment for State funds.

Despite a statement by the President of the Canal Company that the company books, vouchers, and "any other information in our power will be gladly submitted," the committee, after an inspection of the available material and reports, told the officers of the Joint Companies that their reports were insufficient to comply with the House resolution. The company officers refused to allow the committee to examine additional records or reports and, the following day, the Legislature dismissed the committee, over the protests of the Essex County representatives; the Joint Companies maintaining that the committee "would be satisfied with nothing short of carting all the vouchers of both companies to Trenton."

It is interesting to note that, on January 27th, a citizens meeting was held in New Brunswick. The President of the Canal Company appeared with "an hour's speech, ready cut and dried . . . in defense of the Subscription Bill." The opponents of the Canal Company were prohibited from speaking, by "loud cries" from groups of the Bill's supporters, and the President of the Canal Company controlled the proceedings without any opposition.

A meeting of a group of Sussex County citizens at Newton, early in February, "indignantly rejected" the nomination of a Mr. Ryerson, a Council member and ardent supporter of the Bill in Trenton. The group then proceeded to pass resolutions "deprecating the passage of the bill."

Another meeting was held in Salem County "for the purpose of expressing their opinions relative to the Subscription Bill." Despite strong efforts of the Monopolists in the lower counties to win supporters for their Bill, "resolutions were adopted by this meeting, with great unanimity, deprecating the passage of the bill."

As a result of the high-handed tactics used by the Joint Companies in forcing the dismissal of a legislative committee and meddling in the New Brunswick meeting, state-wide opposition to the Subscription Bill

was steadily growing, and the northern peoples' hope for a railroad across their section of the State became more than a remote possibility. The first encouraging word of the impending birth of the New Jersey Railroad and Transportation Company comes in a letter dated February 25, 1832, from the *Newark Monitor's* correspondent in Trenton. "The application for a Rail-Road from the Hudson River to New Brunswick, called the New Jersey Railroad, has a prospect of success, but the Monopolists say they must have something before anybody else can have anything."

Despite the increasing hope that the Subscription Bill would be defeated and a charter granted to the northern advocates of the New Jersey Railroad, the later part of February saw Trenton in a state of chaos. Both sides in the Subscription Bill battle used various methods, ethical and unethical, to aid their respective causes. The minutes of both the Assembly and Council, for the last two weeks in February, record the various moves to amend the Bill to suit the respective causes. Each section of the Bill was argued at length. The monopoly clause, which granted the Camden and Amboy exclusive rights over New York-Philadelphia traffic, was the subject of a particularly bitter debate. When it became evident that the monopoly clause was going to be defeated by the coalition of anti-Monopolists, the Joint Companies' supporters began to employ delaying tactics, until it was possible to rally their forces for a showdown vote on the monopoly privileges.

The northern newspapers continued their support of the contemplated railroad from the Hudson to New Brunswick and vigorously attacked the Joint Companies' attempts to block all legislation until they secured the passage of the monopoly clause. The *Newark Monitor*, in one of its scathing articles on the delaying tactics, stated that "the present session of the Legislature will prove itself without parallel in the history of New Jersey. At no period since the establishment of our State Government have such untiring efforts been used to prostrate the power of the people . . ." It was during this stalemate in Trenton that reports of the probable chartering of the New Jersey Railroad, from the Hudson to some point on the Camden and Amboy, became more frequent. It was quite obvious that, for the first time, the monopoly interests were running into serious opposition. The northern representatives in the Legislature and the numerous citizen delegations from Essex, Morris, Union and other sections of New Jersey were proving a stronger force than the Monopolists had anticipated.

On March 1, 1832, the Joint Companies were shocked to see the Subscription Bill defeated by a decisive vote in both houses, despite their efforts to stall the balloting. However, the opponents of the measure, led by J. P. Jackson, forced the vote which resulted in its surprising defeat. The Camden and Amboy and the Canal interests quickly recovered from this initial blow to their power and prestige and introduced a new act. The new proposal was "clever and plausible in construction . . ." and gained the support of all but the most ardent anti-monopolists from the northern part of the state.

In the new bill of the Joint Company, the two concerns pledged an annual payment of thirty thousand dollars to the State Treasury, should the State's revenue from its shares of the Joint Companies' stock and transit duties fall below that sum. In return for this annual guarantee, the State pledged, in Section 2 of the new proposal, "that it shall not be lawful, at anytime during the said Railroad's charter, to construct any other Railroad or RailRoads in this State, without the consent of the said companies, which shall be intended or used for the transportation of passengers or merchandise between the cities of New York and Philadelphia, or to compete in business with the RailRoad . . ."

This detailed clause granted exclusive privileges to the Joint Companies to control any and all traffic between the country's largest two cities. Despite the obvious monopolistic character of this new proposal by the Camden and Amboy, the supplement to their original charters was adopted on March 2nd. The Companies' pledge of the annual sum of \$30,000 to the State gained the support of numerous economy-minded legislators, regardless of their feelings toward the monopoly clause. As Wheaton Lane says: "To lower the tax estimate almost to a nullity was to realize something beyond the dreams of the most conservative legislator at Trenton. To the owner of real estate, whether farmer or urban dweller, the prospect for diminished taxation looked most enticing."

In the granting of this monopoly to the Joint Company, the State of New Jersey expanded the scope of its sovereignty far beyond its previous limits. In the present era of a positive accent on centralization and increasing Federal controls, it is difficult to understand the widespread movements away from Federal controls. However, the state psychology of the period after 1830 was marked by a broad exercise of their respective powers under the Constitution. Acts of the above type were rather common during this period. Both Pennsylvania and Virginia maintained that they had the right to regulate the traffic crossing the Ohio River. Massachusetts and New York demonstrated their sovereignty by taxing immigrants passing through their ports.

Today the law would be declared unconstitutional because it was a restraint upon interstate commerce, the regulation of such commerce being reserved to the Federal Government. Nevertheless, today is not the 1830's and passage of the monopoly clause allowed the Camden and Amboy interests, under the command of the Stockton family, to emerge supreme—the Legislature, the State and probably the most valuable railroad right-of-way in the United States were now firmly under their control. "Since the companies paid nearly the whole of the state revenue, the monopoly managers gradually acquired a sense of state ownership which lent a certain arrogance to their conduct. For many years, protests within New Jersey and from New York and Pennsylvania were ineffective. New Jersey rapidly became known as the "Camden and Amboy State."

CHAPTER TWO

The Early Days

With the control of the New York-Philadelphia right-of-way legally under its iron hand, the Camden and Amboy offered little resistance to the chartering of the New Jersey Railroad and Transportation Company. In fact, the monopoly amendment to the Joint Companies' charter contained a supplement which stated "that nothing in this act shall be construed as to prevent the construction of a Railroad from the city of New Brunswick to the Hudson River . . ."

With all the opposition quieted, the northern Jersey railroad interests introduced into the Legislature a bill entitled, "An Act to Incorporate the New Jersey Rail Road and Transportation Company." On March 6th, the bill was read in the Assembly and on the question, "Shall this bill pass? It was determined in the affirmative unanimously." On the same day, the Council passed an act to incorporate the New Jersey Railroad, but several amendments were laid on the table. The following day the charter was issued. Thus, on March 7, 1832, the New Jersey Railroad and Transportation Company became an official entity.

The rejoicing in the northern sections of the State was widespread. The March 8th edition of the *Newark Daily Advertiser* proclaimed, "The New Jersey Railroad Bill is a LAW." Continuing, the paper maintained that the new road "creates an entire thoroughfare communication from New York to Philadelphia; a most desirable accommodation . . . The Bill is liberal in its provisions and, unless embarrassments are thrown in its way, will enable the stockholders to fulfill the objects of the charter, greatly to the advantage of the community at large." The papers advocated that the stock should be generally distributed "among the people of New Jersey, in order to make the company in fact, what it is in name, a New Jersey Railroad and Transportation Company." Preference in the stock should be given "to the citizens of New Jersey" and "it is hoped that . . . citizens generally, will be mindful and make the necessary application at the time of subscribing."

The *Advertiser's* Trenton correspondent, in his enthusiasm, even played down the Monopoly Bill, saying that it "is not considered of as much advantage to the Companies, as upon first impression, it would seem." The provisions of some of the sections are so vague "that many doubt whether they (the Joint Companies) have secured any practical protection . . . It is declared that the New Jersey Railroad has obtained as complete protection, by the act protecting the great companies, as they themselves have . . ."

Despite the premature enthusiasm of the *Advertiser's* correspondent, it was soon to be discovered that the Joint Companies were determined to exert to the utmost the powers they had received. The Companies "clung to the contract and at every protest pointed to the letter of the bond. More than that, they created a political machine by which to protect their position from attacks by Legislature or courts." It was this very Monopoly Bill and the political machine which the Stocktons built around this grant, that harassed the New Jersey Railroad, from

the day it was chartered until its capitulation to these very same monopoly interests, some thirty-five years later. The New Jersey Railroad, despite its lucrative route and excellent management, never had a chance to survive. At every turn, the Camden and Amboy blocked each effort that the railroad took to improve its position. It is a credit to the New Jersey Road and its officers that the organization lasted as long as it did.

The charter of the new road was, as the *Advertiser* said, "liberal in its provisions." The charter contains twenty-three sections, which cover in detail the more important points, but still permit enlargement of the road's facilities if the occasion should ever demand it. The original capitalization of the corporation was \$750,000, in shares with a par value of \$50 each. A provision to increase the capitalization to \$1,500,000 was also included in the charter.

The following were named as Commissioners to accept stock subscriptions: John S. Darcy, William Chetwood, Isaac Baldwin, A. W. Kinney, Garret Sip, Wm. Edgar, C. L. Hardenberg, Thomas Muir, William R. Allen, James C. Vandyke, Wm. Pennington, Z. Drake, Amzi Dodd, Jacob Mead, Thomas Slater, A. W. Corey, Joseph W. Scott and James S. Nevins. The subscription books were to be opened on successive days in New Brunswick, Elizabethtown and Newark. Preference was to be given to residents of New Jersey. Provision was also made for purchasing the stock in several installments, after an original payment of five dollars a share.

The stockholders would have the right to elect nine directors, either in person or by proxy, each share being entitled to one vote. Five directors were to be the quorum necessary to transact business.

The directors of the road were vested with power to construct a railroad "not exceeding sixty-six feet in width, with as many sets of tracks as they may deem necessary, from such point in the city of New Brunswick . . . through or near the villages of Rahway and Woodridge, and within one-half mile of the market-house of Elizabethtown, and through Newark by the most practical route; and thence contiguous to, or south of, the bridges crossing the Hackensack and Passaic Rivers, crossing Bergen Ridge . . . , to some convenient point no more than fifty feet from high-water mark, on the Hudson River, opposite New York."

According to provisions in its charter, the New Jersey Railroad was required to build a branch, as soon as any ferry was placed in service on the Hudson, from the ferry depot to a point on the Hackensack River "best calculated to give said ferries equal communication with Newark," and, if this provision was not fulfilled, the ferry company had the power to build a railroad. This provision was inserted in the charter by the Stevenses, of Hoboken, who had for sometime been contemplating a ferry from New York to the vicinity of Hoboken. Before many years had passed, this stipulation was to prove very costly to the New Jersey Company.

The Board of Directors was given the necessary power to condemn land needed for its right-of-way, provided impartial commissioners were appointed "to appraise the lands and injuries done." In case

of dispute between the Commissioners and the property owners, the Court of Common Pleas decision was to be final.

The new corporation was required to commence construction on "said road at Jersey City and New Brunswick," within two years, and was, within five years from its charter issuance, to begin operations, under the penalty of having its charter declared null and void.

The New Jersey Railroad was also "to have power to purchase the turnpike roads and bridges on the route of the . . . railroad, which they may deem necessary . . ." Excepted from this by a proviso were the Newark Turnpike Company and the Bridges over the Passaic and Hackensack Rivers. It was this exception to their rights that proved extremely costly to the railroad when construction was commenced.

The charter limited the tolls and prices the company could charge to no more than "six cents per mile per ton, . . . or six cents per mile for carrying each passenger . . ." The company was also prohibited from charging more than \$1.25 per trip from New Brunswick to New York. The actual fare charged by the company never approached this sum; so the road was never handicapped by this provision.

The Treasurer of the corporation was required to submit under oath, on the first of each year, a statement "of the number of passengers, the number of tons of goods, wares, and merchandise, transported . . ." on the road, to the State Treasurer. In addition, if at anytime after the completion of the rails to New Brunswick, "any railroad shall intersect or be attached to the railroad . . . , so as to make a continued line of railroads, carrying passengers across the State of New Jersey, between the States of New York and Pennsylvania, . . . , then it shall be the duty of the Treasurer of the company . . . , to make quarterly returns of the number of passengers, and the number of tons of goods, wares, and merchandise, transported over the whole line of the road . . . to the Treasurer of this State . . . and . . . to pay the said Treasurer of this State at the rate of eight cents for each and every passenger, and the sum of twelve cents for each and every ton of goods, wares and merchandise, so transported . . ." It was this latter proviso, which forced the New Jersey road into lengthy and expensive litigation with the State in the future.

The State reserved for itself the right, as was the custom in this era, to purchase, at the end of thirty years from the completion of the road, the entire road and its facilities, after a fair appraisal shall have been made by a committee appointed by the Legislature. The State also maintained "the privilege of subscribing for one-fourth of the capital stock" of the company and "shall have the appointment of three of the said directors of the company to represent same; but, if the said stock shall not be subscribed for, within two years . . . the right to subscribe . . . by the State shall cease."

The new railroad, before it was a week old, faced its first battle for survival. On March 9th, the New Jersey, Hudson and Delaware Railroad Company was chartered to build a road from the Delaware, in Sussex County, to the Hudson, opposite New York, with the very liberal

provision that it could construct any number of side roads. The backers of the New Jersey Railroad and Transportation Company immediately suspected that the backers of the new road planned to construct the road only from Newark to Hoboken, with no attempt being made to complete the new road to the Delaware, within the twenty year life of the charter. The New Jersey Railroad supporters rallied enough votes to their side to force an amendment to the new bill, restricting the new railroad "from crossing the River Passaic south of the Village of Bellville, or approaching within three miles of the Newark Bridge" thus effectively blocking any threat of competition from the New Jersey, Hudson and Delaware Railroad Company.

The Commissioners for receiving subscriptions for the New Jersey Railroad's capital stock held the first organizational meeting on March 22nd, as prescribed in the charter. The Commissioners appointed General John S. Darcy, of Morris, President, and John P. Jackson, of Newark, Secretary.

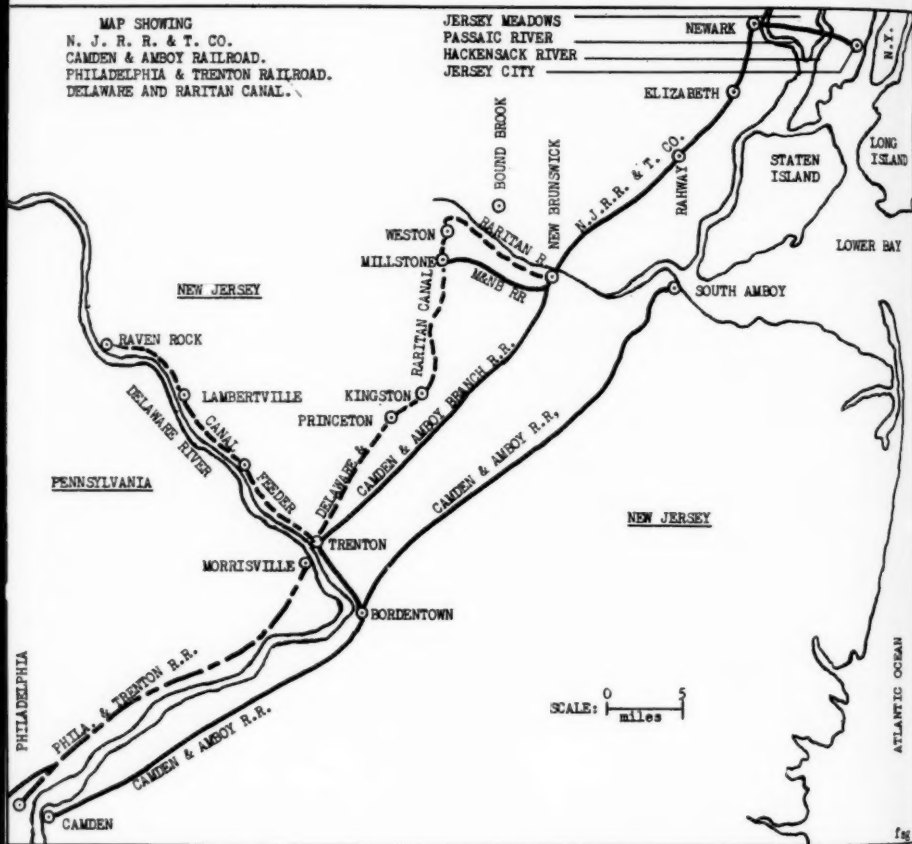
The *Newark Daily Advertiser* continued its campaign to encourage the citizens of New Jersey to exercise their preference in subscribing to the new stock, as provided in the charter. "We know of no work of Internal Improvement, . . . , which promises to be at once, so profitable to the stockholders and so beneficial to the public. Its route is through a thickly settled and manufacturing district of the country, which will . . . afford no small amount of business." The *Advertiser* followed up these articles throughout March and April, devoting many columns to praising the railroad and its stock—"Indeed we know no equal distance in the United States, where the communication is so great . . . Even as a local road, it will be the great line of communication through a populous section of the country." These and many more praises were daily handed to the new road.

On March 27th, the *Monitor* printed an advertisement announcing the opening of the stock subscription books "at the Bell tavern in New Brunswick on Tuesday, the first of May next, at Sanderson's (Late Noe's) tavern in Elizabethtown, on Wednesday, the second day of May next; and at Z. Drake's Hotel in Newark, on Thursday, the third of May next. Five dollars will be required to pay upon each share at the time of subscribing."

On the eve of the opening of the subscription in New Brunswick, the *Advertiser* extolls the stock for the last time, saying, "Tomorrow the books of Subscription are to be opened in New Brunswick . . . Our information leaves no doubt but that the stock will be eagerly sought after, and we are satisfied it will be among the most productive investments in the country. The shares are but fifty dollars each, and only five dollars are required at the time of subscribing; thus affording to persons desirous of taking a small number of shares, an opportunity to do so."

Despite the enthusiastic support given to the stocks of the New Jersey Road by the newspapers and the citizens in general, less than one-tenth of the whole subscription was purchased by the people; and





Map of N. J. R. R. & T. Co. and Connecting Railroads.
Drawn by F. Stewart Graham.

less than one-half of that was purchased in Newark. The Commissioners were dismayed to discover the lack of interest in the stock by the public, but they were not discouraged, believing the opposition of the Bridge and Turnpike Companies to the railroad was the main cause of the public's apathy, but they believed this would be overcome. The Commissioners quietly pledged their personal credit to the unsubscribed stock. The papers were told the stock had been over subscribed, in an effort to maintain the public's confidence in the new venture. The *Journal*, therefore, printed the following report: "The books of subscription . . . were opened . . . and the whole of the stock was promptly taken and a large excess subscribed for."

On June 4, 1832, the first election of Directors was held, and the following gentlemen were elected to the first Board of Directors: John S. Darcy, of Morris; A. W. Corey, A. W. Kinney, and Z. Drake, all of Newark; William Chetwood, and Thomas Slater, of Elizabethtown; George P. Molleson, of New Brunswick; William R. Allen, of Burlington; and Alexander M. Muir, of New York City. At a subsequent meeting of the newly elected Directors, General J. S. Darcy was unanimously elected President and John P. Jackson, Secretary of the Board.

The new Board, early in the fall, requested bids "for the Grading and Mason work of that part of the Route of the . . . Railroad, from the Hudson River, through Newark and Elizabethtown, to Rahway." During this same period, the directors also began their long drawn out negotiations with the bridge and turnpike companies along the projected route, in an effort to secure the legal rights to cross the rivers along the route.

By the end of October, the road from Jersey City to Elizabethtown was placed under contract. The terms of this initial agreement were "more favorable than the original estimates furnished by the Engineer of the company . . ." and the contractor was obligated to complete the work within a year. The *Monitor* anticipated "great advantages from this work . . ." and urged the prompt completion of the road to Newark. By the first of December, an observer on the stage from Jersey City stated that "considerable excavations have already been made" on the embankments from the Hudson to the Hackensack and "a very strong and experienced company" plans to maintain a large force of laborers throughout the winter if the weather permits.

The excellent progress on the right-of-way was offset by the difficulties that the officers were having in securing the previously mentioned monopoly rights from the Bridge and Turnpike Companies. At first it was feared that the construction would have to be halted until a court decision was rendered, and for a time it appeared that the public had shown excellent foresight in not subscribing to the stock.

Under their original charter of November 24, 1790, the "Proprietors of the Bridges over the Rivers Hackensack and Passaic" were granted exclusive rights to all bridges over the Hackensack River, from its mouth to Kingsland Creek, and over the Passaic River, from its

mouth to the junction with the Second River. The prohibited areas unfortunately were in the path of the New Jersey Railroad's projected right-of-way and any alternative routes were impractical. To add to their already mounting difficulties were the protests of certain Newark interests, which felt that another bridge over the Passaic would "prove highly injurious to the best interests of this town and its vicinity, by preventing the free access of vessels to the various wharves and landings now in use." The citizens were urged to unite to resist this "outrage upon their rights . . ." The citizens' protests were sporadic and the officers of the railroad finally resisted the numerous efforts by the boat owners to prevent the construction of the bridge across the Passaic.

The protests of "The Proprietors of the Bridges over the Rivers Passaic and Hackensack" were not easily dismissed because of their obvious monopoly rights. This impasse was finally settled by an agreement between the Railroad and Bridge Companies. The New Jersey Railroad agreed to purchase control of the Bridge Company's stock, either paying the stockholders \$150 a share, or, in lieu of cash, three shares of the railroad's stock, which had a nominal value above their \$50 par. It was fortunate for the railroad, with its limited resources, that a majority of the Bridge Company stockholders preferred the three-to-one exchange of stock, instead of a cash payment. By the end of 1836, the New Jersey Railroad's holdings of the United Hackensack and Passaic Bridge Companies totaled \$113,759.19.

The railroad was also forced to acquire a large number of shares of the Newark Turnpike Company, both in the open market and from the Trustees of the Free Schools. The latter transaction was authorized by the Legislature. The New Jersey Road exchanged two hundred and fifty shares of its capital stock for a like number of shares in the Newark Turnpike, held by the Free School trustees. In return for this privilege, the railroad guaranteed to maintain an 8% dividend on the School Fund's shares of railroad stock. By December, 1836, the New Jersey Railroad carried on its books stock in the Newark Turnpike valued at \$25,780.58.

The large capital outlays required to purchase control of these various monopoly rights along its right-of-way resulted in additional strain on the already limited resources of the infant company. It should be recalled that less than 10% of the authorized capital of \$750,000 was publicly subscribed, and a large portion of that was to be paid in installments over a period of several years. The Board of Directors was by now desperate for funds—the personal credit of the Commissioners being of little help.

"It was at this important juncture in the affairs of the company that the enterprising house of Nevins, Townshend & Co., and their associates, embracing capitalists of New York and New England, entered into an engagement to become proprietors of the stock subscribed by the Commissioners . . ." The worst dreams of the newspapers had finally come true—The New Jersey Railroad and Transportation Company

was controlled by a group of out-of-state capitalists. Despite the predictions of the newspapers, the financial arrangements between the two parties worked out satisfactorily. At no time, even during the hard times after the Panic of '37, did the outside supporters attempt to exert their control against the interests of the people, the railroad, or the State.

The new capital enabled the railroad to push its construction. In October, 1834, an agreement was entered into with the Paterson and Hudson Railroad. The New Jersey Railroad agreed to lay two permanent tracks and maintain them, allowing the Paterson and Hudson the use of their tracks, from the west side of Bergen Ridge, on an equal basis. In return for these privileges, the Paterson and Hudson agreed to pay the New Jersey Company a toll of six cents a passenger.

In order to obtain the above toll from the Paterson and Hudson, the Bergen cut had to be opened for service within five years. The Directors realized that the cut would have to be blasted through solid rock and would require several years to complete; so they immediately let the necessary contracts for the work. It was also during this period that the preliminary work on the bridges over the Hackensack and Passaic Rivers was undertaken.

The crossing of the Meadows was proving far more difficult than was originally planned. Tidal waters were constantly hampering work and causing the fill to settle. An account in the *Advertiser* tells of "a piece of low spongy ground" that began to settle "and sink out of sight." The hole increased in size, despite the tons of dirt thrown in, until the opening was 150 feet by 60 feet. It was such unforeseen events as these that raised the original construction estimates almost threefold before the railroad was finally completed. On May 1, 1833, the Engineer's Report estimated that the final cost of the road would be \$860,236. However, by 1839, the cost of the road had reached \$1,951,638.34, with extensive improvements still incomplete. It should be remembered that the New Jersey Railroad and Transportation Company was one of the first railroads in the United States and was constructed "before the experience of Engineers had enabled them to approximate accuracy in their estimates . . . The projectors of the work were more misled than the first managers of the New Jersey Railroad . . .

The difficulties encountered crossing the Meadows continued to hamper the progress of the road toward Newark. An observer reported in September, 1834, that he "traversed the line of the Railroad from Jersey City to this place. (Elizabethtown) The ground from Jersey City to Newark is very unfavorable" despite the cars of fills, and "it will probably require a large part of another season for the completion of the road between Newark and Jersey City . . ." The contractors constantly employ a force of 300 men and 200 teams of horses in this section, in their attempt to maintain a solid fill across the treacherous Meadows.

The summer of 1834 saw most of these construction difficulties overcome on the Jersey City-Newark section of the road. The Newark

Advertiser hopefully reported that "The railroad is progressing rapidly towards a completion of its tracks . . . The rails, we perceive, are now being laid in Market Street (Newark) and this whole section of the Road will . . . probably be ready for use, and open to the public at an early period." The paper's first report was not far from being right because, on the morning of August 29th, it reported that work is so far completed "that a Railroad Car will transport the officers of the Company from Broad Street, Newark, to the Hudson River, positively tomorrow afternoon." At last the fond visions of the New Jersey's supporters were about to become true. The first and most difficult leg of the railroad over the Meadows and across two rivers, the Hackensack and Passaic, had finally been completed for use on a temporary basis. The engineers decided that the fill would have to have additional time to settle, before the first steam locomotive could safely be supported. Therefore, plans were made to have the cars over this section of the road drawn by horses, until such time as the embankments were declared firm enough to support locomotives.

The cut through Bergen Ridge was also far from being completed; so it was necessary to lay temporary track around the ridge. Despite these two difficulties, the road was ready to carry its first passengers and that is all that really mattered to the friends and supporters of the New Jersey Railroad and Transportation Company.

CHAPTER THREE

Open For Business

It was on September 1, 1834, that the Board of Directors and a party of friends made the first trip on the newly completed road, in the splendid car "Washington." The car, drawn by a team of sturdy horses, started from the Eagle Tavern, in Broad Street, and "traversed the entire track to Jersey City, to the entire satisfaction of the whole company." After a gala celebration in Newark, the horse-car made another round trip to Jersey City, to return some of the guests to the ferry. The car "Washington," in which the trips were made, was the topic of discussion among the people along its route. A contemporary writer described the horse drawn passenger car as "a splendid and beautiful specimen of workmanship, containing three apartments, besides seats on the top."

The new route was opened to traffic on September 15th, according to newspaper advertisements, which announced, "Eight trips each way, every day." The first trips left both Jersey City and Newark at 7, 8, 9 and 11 o'clock A. M., and 1, 2, 3, and 5 o'clock P. M., stopping for the purpose of receiving and delivering passengers at Chandler's Hotel, at the corner of Broad and Mechanic Streets; at Dickerson's Hotel, at the foot of Market Street, at the west end of Centre Street Bridge over the Passaic, in Newark, at the Hackensack Bridge, and at the Paterson Depot, in the Meadows. The trip between the two towns took approximately an hour and a half's running time and the fare was 37½ cents one way.

By Mid-December, the new railroad was averaging five and six hundred passengers daily. The first year's operations, however, were a definite disappointment to the backers of the company, as the total receipts were less than \$100,000, and the number of passengers was only 200,000. Despite their expressed disappointment, the Board of Directors declared the first dividend of three percent, on July 1, 1835. At this time, it should be recalled that nine-tenths of the capital stock was still held by Nevins, Townshend & Company and their associates, and only a few shares were held by "a small number of Jerseymen, who were only forty-six in number." Despite this low return on their large investment, the New York firm maintained its original confidence in this young enterprise and continued to procure additional capital for its constant expansion.

In response to the demands of the public and the newspapers in Elizabethtown, arrangements were promptly made to push the rails southward. The *Jersey Journal* complained that there was a "section of country around Elizabethtown that carries on extensive business in New York . . .," but was forced to use the slower water transportation, and it would be both in the interest of the public and the stockholders to complete the road to that city promptly.

The officers of the New Jersey Railroad were also completing negotiations with the Common Council of New Brunswick and the New Brunswick Bridge Company, in an effort to secure a route through the town, satisfactory to all parties. Section Six of the New Jersey Railroad's charter required the road to locate their right-of-way through the various towns on its route "by and with the consent" of such towns. The Common Council and the railroad both appointed committees to confer on the route, in October, 1835. The Board of Directors of the railroad desired a route through the city, paralleling as closely as possible the New Brunswick Turnpike. The Common Council at first passed a resolution requiring the road to pass along Albany Street, which was not in line with the railroad's projected route. The two parties finally agreed, with the Common Council giving way and adopting the following resolution: "The route of said Railroad shall be through the city, between Miller's Brook on the south and Mine Brook on the north." However, the Council passed an additional amendment to this resolution, on October 19th, providing that before "this Resolution shall go into effect, the . . . President and Directors of the New Jersey Railroad and Transportation Company shall enter into such security as shall be agreed upon by the Board of Common Council, not to use Locomotive Engines through the public streets of this city." It was on this later restriction that the railroad balked and the negotiations were once again deadlocked. The New Jersey Railroad said it would terminate its tracks in East Brunswick (now Highland Park), rather than submit to above restrictions. The Common Council on December 2, 1833, finally submitted to the railroad and passed another amendment authorizing the Road to commence construction "without being subjected

to the conditions of the Resolution . . . of October 19th, by a vote of six to two.

No sooner had the railroad straightened out its route through New Brunswick and made the necessary arrangements to place this section of the road under contract, when a new difficulty arose. The New Brunswick Bridge Company began to protest about the viaduct that the New Jersey Railroad was planning to build over the Raritan. The Bridge Company claimed their rights, under a charter of 1791, which stated that "no person or persons whatsoever, nor body politic, shall at anytime hereafter build . . . any Bridge or Bridges over the . . . River Raritan . . . under the penalty of five hundred pounds . . . between Raritan Landing and Laurence's Brook" would be violated.

However, the initial protests of the Bridge Company died out; so the Board of Directors placed the viaduct over the Raritan under contract. During the early stages of construction, the Bridge Company remained silent and refrained from taking any legal action against the railroad company. Finally, as the railroad structure was nearing completion, and seeing that the new bridge had a lower story with a wagon and footbridge which would compete with its bridge, the Bridge Company decided to seek an injunction. Under the threat of litigation, the New Jersey Railroad and Transportation Company settled the dispute by purchasing 600 of the 1000 shares of Bridge stock outstanding, at a total cost of \$34,920. The purchases were completed by early September, 1836, and on the sixth, at a meeting of the shareholders of the Bridge Company, at the City Hotel in New Brunswick, John P. Jackson and George P. Molleson, Directors of the Railroad Company, were elected President and Treasurer of the Bridge Company. With another important and costly obstacle behind it, the New Jersey Railroad now had a clear route into the City of New Brunswick, its terminus.

During the long months while the railroad was attempting to prepare its entry into New Brunswick, progress in the north was continuing at a fast pace. In March of 1835, the first steam locomotive was taken on a trial run, with rather unsatisfactory results. The experimental engine broke down a few miles from the Newark Bridge, forcing the passengers to complete their journey by foot. The officers assured the public that the new locomotive would be immediately banished to the hauling of freight, to avoid any possible future inconvenience. The railroad did not wholly reject the use of steampower and announced that it had on order "two locomotives, which will be introduced upon the road early in the season."

The approach of spring saw a sharp increase in passenger traffic between Newark and New York, and the railroad was pleased to announce, for the first time, an increase in service: "To afford a more complete accommodation to the Public, two additional cars will be run between Jersey City and Newark. The company also will have extra cars in readiness at both terminals to meet any increase in traffic." It was fortunate that the Company had sufficient vision to foresee an

increase in traffic because, within two weeks, it was announced that 650 passengers were carried on a single day, breaking all previous records. The Newark *Advertiser* proudly boasted, "When we contrast this vast flow of traveling with the comparatively small stream of but two or three years since, the transition is surprising, and connected as it is with a corresponding increase in the business operations of the town, all wonder at the rapid rise of Real Estate in Newark must be dispelled." A few figures will show that the *Advertiser* was not exaggerating. In 1832, before the railroad had reached the town, the population of Newark, according to estimates, was about 14,000. By 1835, less than twelve months after the Transportation Company's tracks reached its outskirts, the population of Newark had grown to 18,201. The year 1836 saw another increase in population to 19,732, with a corresponding growth in business. It is interesting to note that, in 1836, Newark was able to "support 18 churches, 26 lawyers, 23 physicians, 3 banks, 3 insurance companies, 4 newspapers—one daily, one semi-weekly, and two weeklies, 18 inns and taverns, 3 drug stores and a large and varied number of industrial institutions."

In its efforts to keep pace with the influx of passengers on its horse car line, which, by early in May, carried 750 passengers across the Meadows in a single day, breaking the old record once again, the road increased its service to ten daily round trips between Newark and Jersey City. The first week in June, 1835, saw the institution of night cars between the two cities. The night cars left the Ferry in Jersey City, at nine and midnight, and Newark, at ten-thirty in the evening.

In a statement to the public it is interesting to observe the monthly increase in passenger traffic, after the first five and a half months travel, on the Jersey City-Newark Line. From the opening of the line on September 15, 1834, to March 1, 1836, 41,712 passengers were carried, an average of 7,584 per month. The approach of warmer weather led to a gradual rise in passenger traffic, as the following figures indicate:

From March 1, 1835 to April	1, 1835 passengers numbered	8,316
From April 1, 1835 to May	1, 1835 passengers numbered	10,036
From May 1, 1835 to June	1, 1835 passengers numbered	12,540
From June 1, 1835 to July	1, 1835 passengers numbered	13,222
From July 1, 1835 to August	1, 1835 passengers numbered	16,223

It was because of the rapid and rather unexpected increase in passenger traffic that the Board of Directors, elected at the stockholders meeting on June 5, 1835, and now consisting of former directors Darcey, Woolsey, Dey, Molleson, Corey, and the following newly elected members, Thos. Sutton, Elihu Townshend, and George Schuyler, announced the previously mentioned initial dividend of \$1.50 per share and made a further announcement of its plan to issue additional stock, to provide capital to enable the company to push the rails southward to Rahway and New Brunswick. All shareholders of record of August 1st were entitled to purchase 80 new shares for every 100 shares, or 80% of any fractional amounts the individual holders might have registered in their

names, as of that date. In order to protect existing stockholders, it was planned not to pay any dividends on the new shares until the railroad was completed to New Brunswick.

With the anticipation of additional capital at their disposal, the Directors called for bids for construction of the road from Rahway to New Brunswick. The contracts emphasized that "the grading will be required to be done during the . . . summer, and the early part of next autumn. The whole to be completed on or before the 15th day of October next." By September, the *New Brunswick Freedonian* was able to report that the operations of the contractors working on the roadbed were visible from the banks of the Raritan.

The first week in December saw the inauguration of scheduled steam service. The new Baldwin-built locomotive, "Newark," made the trip from Jersey City to Newark "in fine style; ascending the steep grade at Bergen Hill with the tender and one car of passengers, with entire ease, at the rate of a mile in three minutes." After a brief stop in Newark to take on water, the new engine made the trip to Elizabethtown in about twelve minutes. On Saturday, the fifth, a formal inspection trip was made by the officers and prominent citizens of Newark and Elizabethtown, in two cars hauled by the "Newark," to the satisfaction of all concerned. Mayor Wm. Chetwood, of Elizabethtown, entertained the party at Sanderson's Hotel; then the party returned to Newark to be entertained by the officers of the railroad.

The next to last day of the year 1835, saw "the Directors of the New Jersey Railroad Company celebrate the completion of their road to Rahway . . . by an excursion thither, with a large party of invited guests. The distance (11½ miles from Newark) was traversed by the Locomotive with a train of cars, in from twenty-five to thirty minutes." The people of Rahway and the adjacent areas, aided by artillery fire, bunting and large banners proclaiming THE PEOPLE'S RAILROAD, greeted the visitors. The following day, the first scheduled trains began the three daily round trips between Rahway and Jersey City. The single trip fare was 62½ cents.

The work of laying new upright rails over the uncompleted section of the railroad, from Rahway to East Brunswick, was finally completed the end of the following June. On July 1st, the first string of cars passed over the new section of track, drawn by the new locomotive "New Brunswick," which left Newark at one o'clock and arrived in the East Brunswick depot, in an hour and a quarter, averaging about "twenty-miles an hour, with entire ease and safety." The formal dedication was not held until Saturday, July 7th, 1836.

On the morning of the seventh, when the thirteen car train, "decorated with banners bearing the names of the counties, cities, and villages on the line of the road . . ." and pulled by the "New Brunswick," arrived at East Brunswick, it was greeted by an unparalleled celebration. The Board of Directors and their friends were met by Alderman Zabriskie, and escorted across the wagon bridge by a large band, to the Court House, where the guests were entertained by Mayor C. L. Hardenberg and the citizens of New Brunswick. In the customary exchange

of toasts, President Darcey promised the gathering that he and the other Directors of the New Jersey Railroad would do everything possible to answer the numerous resolutions by the citizens of Newark, Trenton, Bordentown, Princeton and New Brunswick, requesting the rapid completion of a through route to Philadelphia. In closing, General Darcey gave the following toast,—"New Brunswick—her River, her Canal, her waterpower and her Railroad, all acting in harmonious concert, will ensure the expansion of her energies and enterprise, to the north, the south, the east and the west." On this note the celebration was concluded and the train returned to Newark. The road was opened to the public on July 10th, 1836.

The completion of the New Jersey Railroad to East Brunswick left only the Bergen Hill Cut and the viaduct over the Raritan to New Brunswick as the last major projects still unfinished. With the exception of these two tasks, the railroad was at last ready to provide service to the public, all the way from Jersey City to the outskirts of New Brunswick. In a little over five years from the granting of its charter, the officers had completed what for a while had seemed almost an insuperable task. The early years of the new road's construction and initial operations were difficult. Earlier, it was seen that the first year's operations showed receipts of less than \$100,000. The original estimate of the cost of the road's construction sky-rocketed from \$860,236 to \$1,379,282.95, by the end of 1837. It will be remembered that the initial estimates were undertaken in the infancy of railway engineering. On November 1, 1836, L. A. Sykes, Engineer for the New Jersey Railroad, estimated that an additional \$300,416 would have to be spent on the railroad to complete it and even Sykes' estimate fell far short of the final cost. Many unforeseen costs kept appearing as time went on. In 1836, the railroad, as the owner of the controlling interest in Proprietors of the Bridges over the Rivers Passaic and Hackensack, was forced by action of the Legislature to build a new vehicle bridge over the Hackensack "according to the modern plan of constructing bridges," to remove the hazard to navigation which the old bridge presented. The forced construction of the bridge was just a single example of the various unforeseen expenses to which the young railroad was subjected.

Fortunately the rapid mounting expenditures were somewhat offset by the increase in passenger revenues. In the last six months of 1836, the passengers totaled 207,185, with over 40,000 passengers being transported in both July and September. This was certainly a sharp increase over early days, when 15,000 fares a month was considered excellent. A comparison of the number of passengers carried in July '35 and July '36, the two best months for traveling in their respective years, shows an increase from 18,222, in '35, to 40,659, in '36. The three months' totals of May, June, and July of 1835, compared with the same period in 1836, show an increase from 40,229 to 81,822 passengers. The extension of the road to East Brunswick was not open to public travel until July 10th, but, nevertheless, the rest of the month saw 12,162 passengers travel between these two points alone. The receipts for the final week

of July were \$3,800, setting a new record. The gross receipts reflected this sharp rise in traffic by a corresponding increase. The gross receipts from December 1, 1835, to June 1, 1836, were \$41,261.04. The receipts from the succeeding six month period totaled \$89,970.08, an astounding increase of over 100%.

At this point, it should be recalled that the New Jersey Railroad and Transportation Company's charter permitted the State of New Jersey the right to subscribe to one-quarter of the railroad's capital stock. Up to the beginning of 1836, the State had not exercised its privilege of subscribing to the stock, nor had it given the Company any indication of its future action on this option. As we have already noted, the actual construction costs of the right-of-way had far exceeded the original estimates, and unforeseen expenses were constantly occurring during the early era of the New Jersey Railroad. These high and unexpected initial costs had forced the Directors to expend large amounts of the original capital to maintain the Company's financial position and, by the middle of 1836, the railroad was seriously low in capital funds, with the Bergen Cut and Raritan viaduct expenses still to be paid.

The Directors decided that it would be necessary to ask the State to either subscribe to the stock held in reserve in the company's treasury or to relinquish its rights to these shares and permit their sale in the open market. In response to the railroad's request for a decision on the stock, the Legislature appointed a committee "to examine into the condition, affairs, revenue and future prospects of the New Jersey Rail Road and Transportation Company." After a detailed study of the company's conditions and prospects, the committee submitted their report to the Legislature. The *Newark Advertiser* stated, "The report is altogether honorable to the Company; and makes a most satisfactory exhibition of its conditions and prospects."

The report described in detail the condition of the right-of-way, equipment, available means of the company, receipts and expenditures accompanied by complete financial statements, and an estimate as to the future prospects of the company. The committee, when submitting their report, declined to present any specific bill to the Legislature and left the final decision up to that body.

After a lengthy debate, in which the Camden and Amboy interests steadfastly opposed any action on the requests of the New Jersey Company for the subscription to their stock, the Legislature finally acted, on January 26, 1837. On this date, the State agreed to relinquish "a portion of stock reserved . . . , equal to the amount of two hundred and seventy-five thousand and loan the company the sum of one hundred thousand dollars, at the rate of six per cent per annum." The Company to "extend to the State the privilege of investing in their stock an amount equal to the amount of said loan, for a term not exceeding seven years . . ." In accordance with the new act, the Trustees of the Free Schools were ordered to loan the New Jersey Railroad one hundred thousand dollars, on the condition that the governor should have the right to appoint one of the directors of the company.

With additional capital at their disposal, the railroad was able to rush the completion of the last two uncompleted major projects along its route, the Raritan viaduct and the cut through Bergen Hill. On October 31, 1837, the first locomotive and train of cars passed over the viaduct and into the City of New Brunswick proper. The new structure was described by the newspapers as "a beautiful specimen of architecture, and is constructed in the most substantial manner. It is 1700 feet long, and is supported by sixteen pillars, with abutments, that may defy the pressure of ten thousand cars." At last, the Hudson was connected with the Raritan by iron rails. A hundred years later, a historian made this very appropriate statement, "Of all the improvements that New Brunswick has been privileged to enjoy, it is probable that none has been heralded with more enthusiasm and with greater delight than the opening of the New Jersey Railroad."

January, 1838, saw the final touches completed on the Bergen Hill project. Even today, with modern equipment, it would be a difficult task to forge a railway cut through almost a mile of solid rock averaging forty feet in depth. In the early nineteenth century, such a task was considered almost impossible and the entire nation acclaimed the completion of the Bergen Cut as one of the great engineering feats of that period. Bergen Hill itself is one of a series of trap rock ridges that rise in Somerset County and cut diagonally across the State to the Hudson. The rock is very hard and durable and provides a sharp contrast to the soft sandstone in which it is embedded. It was this hardness of the rock that forced the engineers to follow an old water course across the ridge, which was the primary cause for the many sharp turns within the cut when it finally was completed.

When it is considered that the actual work on this difficult task took almost five and a half years, from November, 1832, to June, 1838, and a total of \$455,121.62 was expended on this one project alone, it is little wonder that the railroad was in constant financial difficulties. The contractor's final report provides some very interesting statistics on the project. In the first and a half year period, 256,266 days plus an additional 4,832 nights of labor were hired by the contractors; 171,850 pounds of powder, costing over \$40,000, were used during the blasting; 53,949 pounds of cast steel and 45,000 pounds of cast iron were also used in the cut. In addition to the tremendous monetary expense, the toll in human life and injury was appalling. According to the report, 18 men and 2 women were killed during the construction, and another 100 people were maimed and injured in varying degrees.

The Bergen Cut was a costly project, there is no doubt about that, but its completion marked the end of one era and the beginning of another in the New Jersey Railroad's annals. On January 22, 1838, the first regular train drawn by a locomotive passed through the new cut and on to Newark. The horse car was banished forever and steam now was the sole motive power of the New Jersey Railroad. The railroad could now invest its capital in productive projects, and improve its service by attempting to abolish some of the uncertainty and discomfort

connected with the early horsecar and the combination of steam and horsepower, which had slowed down passenger service since the initial opening of the road.

The first step in the railroad's improvement program was the addition of new motive power units. In October 1837, the company took delivery on the "Sandusky," built by Messrs. Rogers, Ketchum and Grosvenor, of Paterson.* The new engine was huge when compared to the earlier models. It weighed over nine tons and was said "by some disinterested persons to be superior to any heretofore brought into this country." The "Sandusky's" successful operation paved the way for additional locomotives from the factory of Rogers, Ketchum and Grosvenor and, within a decade, the majority of the railroad's steam engines were purchased from these nearby builders.

The company also expended large sums to maintain its way stations in good condition. The old East Brunswick station was succeeded by a fine station in the center of New Brunswick. The old station was retained as a unit of the new car and engine house, which the railroad built in East Brunswick.

In an effort to attract more passengers, the fares were reduced one-third and the extra charge for purchasing tickets on the trains was abolished in favor of giving each passenger a free ferry ticket, as an inducement to purchase their tickets before boarding the trains. The price of tickets between Jersey City and Elizabethtown dropped from 50 cents to 37½ cents, between Jersey City and Rahway, from 62½ cents to 50 cents, and from Jersey City to New Brunswick the fare was reduced from \$1.00 to 75 cents. It is interesting to note that despite the reduction of the railroad fare from New York to New Brunswick to 75 cents, one could make the same journey on the packet "Napoleon" for 37½ cents.

As an additional accommodation to the public, the company arranged to have passengers, destined to locations within the city of Newark, transported over the town tracks in horse cars, from the depot to their respective destinations, for 6¼ cents.

One of the best examples of the railroad's desire to do everything within its power to provide its passengers with comfortable traveling conditions is shown by the following paragraphs from the New Brunswick *Freedonian*. In its December 19, 1838 edition, the paper complained "that despite the generally good attention given to the general accommodations of passengers . . . , we do not know how to account for, or excuse the absence of so indispensable a requirement . . . , as fires in the cars, the lack of which makes traveling in the cold weather very uncomfortable besides jeopardizing the passenger's health." apparently this protest received the prompt attention of the company officials because, the very next week, the *Freedonian* writes, "we take pleasure in saying that the accommodations for way passengers, are altogether convenient . . . The substitution of large Cars, of im-

*The "Sandusky" was received on trial only, and was sold to the Mad River & Lake Erie R. R., the first railroad in Ohio.

proved construction . . . ; and especially the introduction of a goodly portion of calorific into the cars, in place of the congealed atmosphere of a Siberian climate, are concessions to popular favor . . . " It was prompt action of this type which won new passengers to the New Jersey Railroad, and it is on this note that it is necessary to take leave of the initial operations of the rapidly growing railroad to see what part it was to play in the New York-Philadelphia through route.

CHAPTER FOUR

The New Jersey Railroad Attains Maturity

By early December, 1838, the New Jersey Railroad had projected its rails through New Brunswick to the extreme western limits of the city, that is today Dean's Pond. At this point, the New Jersey track was to join with the Camden and Amboy rails, to form the final link in the New York-Philadelphia through line.

The original plans of the Joint Companies to connect with the New Jersey Company had been upset by the attempts of the Philadelphia and Trenton Railroad to defy the Joint Companies. As early as 1834, the Philadelphia and Trenton, a Pennsylvania corporation, with tracks from Frankford Junction to Morrisville, began to challenge the rapidly growing power of the Joint Companies, by attempting to seize an important link in the through traffic. A supplement to its charter, passed by the Pennsylvania Legislature, empowered the Philadelphia and Trenton to acquire the necessary properties to give it a through line between Philadelphia and New York.

In order to extend its track to the outskirts of New Brunswick and effect a union with the New Jersey Railroad, the Philadelphia and Trenton quietly purchased a controlling interest in the Trenton and New Brunswick Straight Turnpike Company, and preparations were made to lay track over the turnpike. In the meantime, the Philadelphia and Trenton confidently petitioned the New Jersey Legislature for the right to place rails over the turnpike. The petition set off one of the worst political demonstrations the State has ever seen. The Joint Companies stopped at nothing to prevent the Philadelphia and Trenton-controlled Turnpike Company from securing the right to lay rails to New Brunswick.

The years 1833-36 saw a formidable array of legal talent, including Roger B. Taney, United States Attorney-General and later Chief Justice of the Supreme Court, Daniel Webster, and other prominent lawyers of that era, attempt to crush the Joint Companies and their monopoly rights over the New York-Philadelphia travel. The Turnpike Company's lawyers used numerous arguments to support their cause—they tried to prove that the monopoly act was revocable, they showed that the Camden and Amboy had not paid their required transit duties to the State, and they emphasized contractual aspects of the original Turnpike charter.

All the Turnpike Company's efforts were in vain and, in the end, the "State of the Camden and Amboy" prevailed. The final defeat of the Philadelphia and Trenton was assured when the Joint Companies purchased 5,500 shares of the Philadelphia and Trenton Railroad's stock and thereby secured voting control of that railroad. With control of the Trenton and New Brunswick Turnpike in their hands, the Joint companies proceeded to extend track from Trenton to the western terminus of the New Jersey Railroad.

While the monopoly interests were battling the Turnpike Company, the Camden and Amboy purchased control of the Trenton Delaware Bridge Company, to prevent the Philadelphia and Trenton from building a bridge over the Delaware, to Trenton. With the Bridge Company also under its control, the Joint Companies were in an excellent position to dominate all through traffic. In 1839, this bridge was rebuilt by the Joint Companies, at a considerable expense, to strengthen the structure and to permit the passage of locomotives. The rebuilding of the bridge was the final link in the direct train service from New York to Philadelphia.

By the end of December 1838, the Joint Companies had completed the branch road from the Camden and Amboy mainline at Bordentown, through Trenton and Princeton, closely paralleling the Delaware and Raritan Canal, then cross country to the southern terminus of the New Jersey Company. This branch line was single tracked, with adequate turnouts to permit the passing of trains. The line was thirty miles and one chain (66 feet) in length, not including the spur track from the line to the Trenton Bridge, seventy-six chains in length.

On the first of January, 1839, the Camden and Amboy branch line was opened without formal ceremonies and, for the first time in history, a passenger was able to journey between the country's largest two cities wholly by rail. It truly was a great event in annals of American railroading. For the citizens of that time, a trip on the connected lines was an event long remembered. The journey now took only five and a half hours from city to city, cutting an hour and twenty minutes traveling time from the Camden and Amboy's South Amboy route. It was a vast improvement over the conditions Ben Franklin was forced to undergo on his six day journey between the same two points, a little over a hundred years earlier.

The advertisements of the new service informed the public that direct service between New York and Philadelphia was now available, two daily round trips each way. Trains left either terminus at nine in the morning and at four in the afternoon, the fare—\$4.00 one way. Passengers on the morning train from New York were able to make connections at Philadelphia with the afternoon train to Baltimore and Washington. Passengers also had the option of crossing the Delaware on the Trenton Bridge or at Camden by ferry.

Naturally, the newspapers of the period were enthusiastic over this new through service, something for which they had long been campaigning in their columns. The *Advertiser* appraised the through

service saying "it is no more than fair to add that accommodations . . . are everything that gentlemanly and attentive agents, comfortable fires, spacious cars and a good cup of coffee can render them."

The color of railroad travel in the 1840's is hard to equal in the history of railroading. People in those days were conservative. They had never before traveled thirty miles without stopping to eat. It was hard for them to become accustomed to the faster pace of rail travel. They had become used to stopping and exchanging compliments and gossip. Perhaps racing across the countryside was a new and exciting adventure, but passing through the large towns or the State capital without stopping for a few minutes was unthinkable. Traveling to them was not simply transportation, it meant pleasures which they were loath to forego." The New Jersey Railroad depot in New Brunswick was the favorite stopping point for many of the earlier travelers. The trains would thunder over the Raritan Viaduct and enter New Brunswick "with whistle blowing, and stop for ten or fifteen minutes while passengers refreshed themselves at the restaurant . . . A great bell hung over the platform and rang lustily when time to leave was near. With much ado, passengers were urged aboard, the locomotive whistled, wheezed and puffed, and travel toward Philadelphia was resumed." The same procedure was repeated in Trenton. That was the old mode of railway travel.

It was also on January 1, 1839, that the New Jersey Railroad Company made one of its intelligent investments, the purchase of the Jersey City Ferry Company. As a result of this transaction, the railroad not only took possession of four ferries, the "New Jersey," "Washington," "Sussex," and "Essex," at a cost of \$70,000, it also acquired, for an additional \$18,224.99, extensive ferry improvements along the Jersey City waterfront. As we shall see, this initial purchase of a ferry site was later expanded to include the exclusive ferry rights for the entire Jersey City waterfront.

It was not long before the public began to complain about the high fares on the New York-Philadelphia through route. The Trenton City Council made a formal protest to the Legislature that the fares were considerably higher than the stipulated rates authorized by the Legislature. Under the original agreement between the Camden and Amboy Railroad and the New Jersey Railroad, signed in 1838, just prior to the completion of the through track, the largest proportion of the New York-Philadelphia receipts poured into the Joint Companies' treasury. The following schedule shows the division of the fares under the 1838 agreement.

	<i>Miles</i>	<i>Proportion of Fares</i>
Camden & Amboy Main Line from S. Amboy to Camden	90	One-half
Camden & Amboy; Trenton to New Brunswick Line	30	One-sixth

	<i>Miles</i>	<i>Proportion of Fares</i>
Philadelphia & Trenton Railroad	30	One-sixth
New Jersey Railroad and Transportation Co.	30	One-sixth

The inequity of such an agreement is obvious when it is realized that the calculations were made on the basis of total miles of trackage controlled by the parties concerned, not on the direct mileage from New York to Philadelphia. In other words, the Joint Companies received 50%, or \$2.00, of all through fares, because their South Amboy route was given equal participation in the contract with the main line track. The New Jersey Railroad carried passengers one-third of the ninety miles between the two cities, but only received one-sixth of the total fares. The New Jersey Company vigorously, but vainly, protested the initial agreement. The Joint Companies' control of the Legislature permitted the adoption of the above apportionment of receipts favoring the railroad interests rather than the public interest.

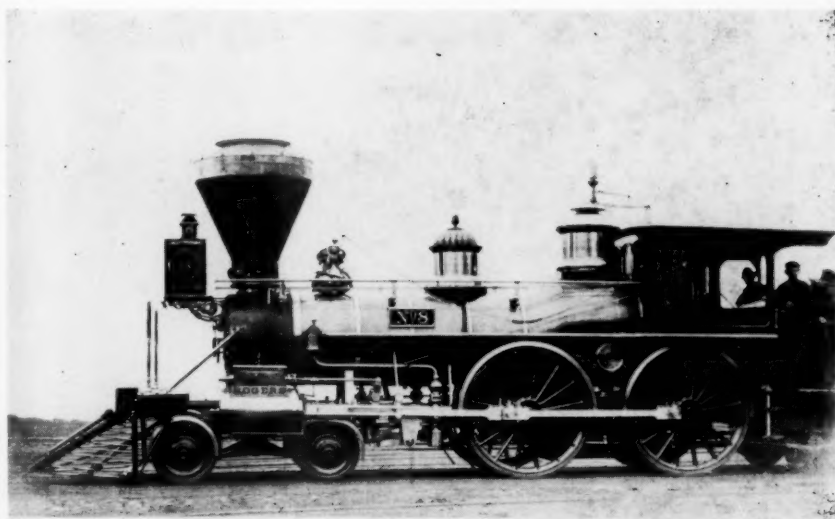
Continuing the public protests against these high fares, the *Newark Advertiser* complained that Camden and Amboy was at fault. The New Jersey Railroad was unable to reduce its fare from Jersey City to New Brunswick, because it was hardly receiving a sufficient return on its investment at the present rates. The *Advertiser* maintained, with plausible explanation, that the Joint Companies were the sole cause for the high fares. The fare to Philadelphia, via South Amboy, was only three dollars, and, therefore, the *Newark* paper maintained the public was forced to pay a dollar extra to travel the quickest and most comfortable route, while the Camden and Amboy attempted to win the economy minded public to their South Amboy route, where they retained 100% of the receipts. Despite the widespread protests, the through fare remained at four dollars, the Joint Companies refusing to submit to any reduction.

However, in 1840, the Joint Companies showed what everyone believed to be a change of heart, when they petitioned the Legislature for an act reading, "It shall not be lawful for said Companies to charge more than \$3 for transportation of passengers to and from the cities of New York and Philadelphia." As one would expect, the hopes of the public were quickly smashed by a Joint Company subterfuge. The company claimed, by a rather liberal reading of their new act, that fares as stated in this new regulation only applied from state to state, not from city to city. Since part of the Camden and Amboy route lay through Pennsylvania, the company continued to charge \$4 for through tickets. To stay within the liberal interpretation of the act, the company only charged a fare of \$2.50, between Trenton and New York. After seeing this exhibition of public defiance condoned by the State officials, the people decided any efforts to reduce fares would be futile; so the protests died down until 1848. It was hopeless to appeal to Trenton—the State was by now wholly controlled by the Joint Companies.

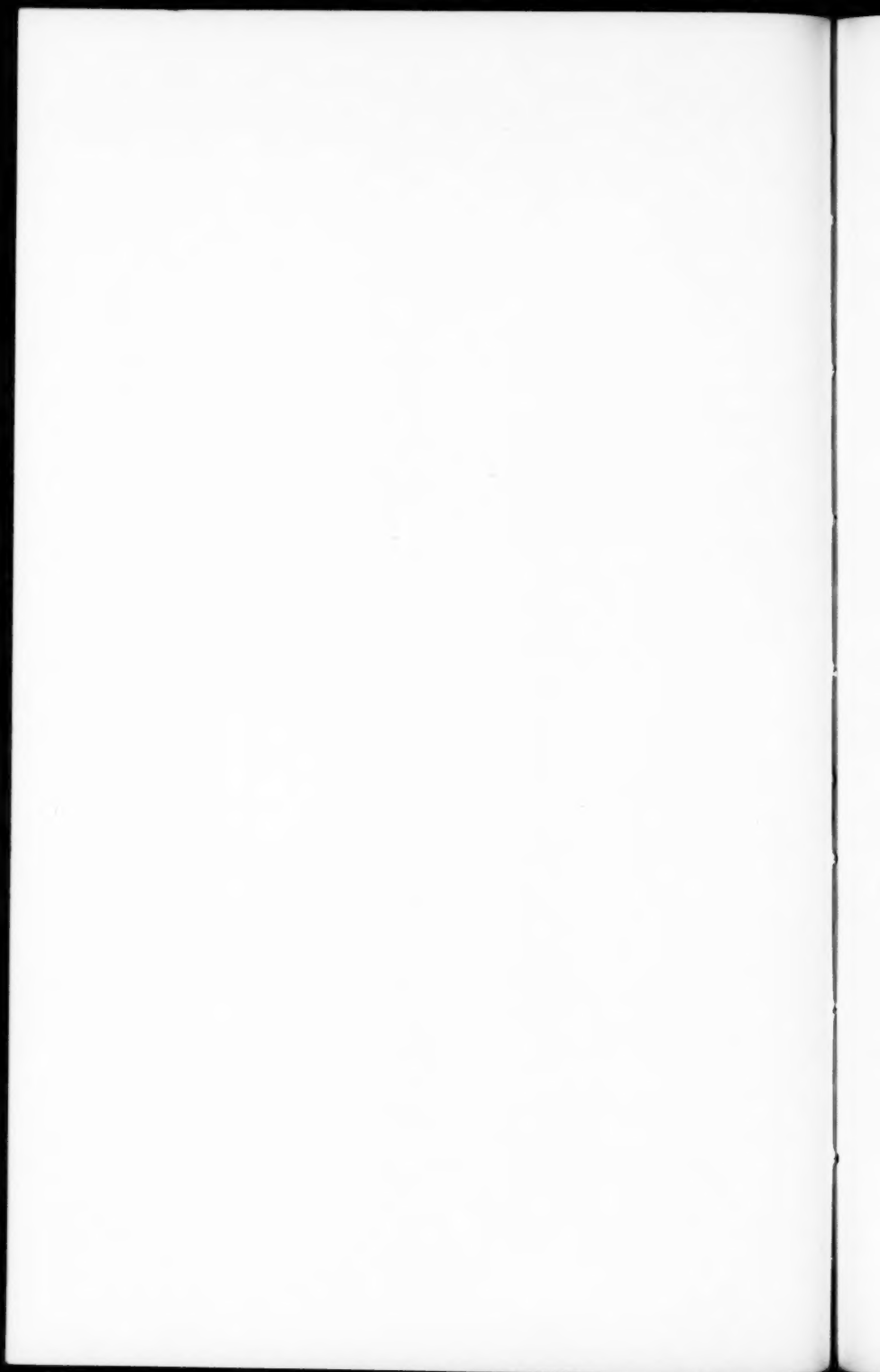


Courtesy of F. Stewart Graham

N. J. R. R. & T. Co. #32. Rogers, 1863. Cylinders 16x22". DD 60".



N. J. R. R. & T. Co. #8. Rogers, 1865. Cylinders 16x22". DD 66".



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The public was not alone in having tariff trouble, the New Jersey Railroad was also having difficulties. According to a resolution passed by the Board of Directors, in 1835, certain stockholders received a "conditional privilege of free passage over the road to and from Newark to New Brunswick, which privilege has been extended over the whole line, during its progress to completion, without any order of the Board: . . . As may be expected, it was not long before this privilege was being abused by certain stockholders, at the expense of those shareholders who did not receive the right to free passage over the company's lines. To prevent any such future abuse, the Directors passed the following resolution, "No stock that shall be transferred, . . . on or after the first day of April next (1839), shall entitle its possessor to any frank of free privileges of conveyance on said road; and that the existing franks shall be all subject to further action of this board." The Board also required all present stockholders with franking privileges to secure a special ticket to present to the conductors.

The year 1839 also saw the institution of the first scheduled freight train on the New Jersey Railroad. Previous to this date, all freight was carried on special cars attached to the regular passenger trains. This method of transporting freight became more and more unsatisfactory as time went on. Passengers began to protest about the unnecessary delays to which they were being subjected while freight was being loaded and unloaded. At first, the railroad officials were reluctant to alter this system because the merchandise carried over the road, in its early days, was so small it never could have supported a special train. However, as the years passed, the towns along the route gradually grew in size and productive power, and trade increased. In October, the railroad inserted advertisements in the local papers, announcing a train would leave New Brunswick, daily except Sunday, at eight in the morning. The "cars are arranged for the Transportation of Horses, Carriages, Cattle and etc. (sic). A Passenger Car is attached to the train for the convenience of those persons who wish to accompany their freight." The railroad also agreed to deliver goods within a mile of the Liberty Street ferry slip, in New York, for a small extra charge.

Despite the added service of the special freight train and attached passenger car, the New Jersey Railroad never developed a large freight traffic. During the initial year of special freight service, a total of 5,295 tons was carried; by 1860, the total freight carried had risen to 115,653 tons. However, most of this freight was way freight, destined for towns along the New Jersey's route. The through freight in those days was shipped over the Camden and Amboy, via South Amboy, or through the Delaware and Raritan Canal to New Brunswick and then by boat to New York. It is strange that the New Jersey Railroad was never able to develop a substantial freight traffic because it was constantly offering new inducements to the farmers and businessmen to win their patronage. In April of 1841, a new produce train was added to the schedule, leaving New Brunswick at 5 a. m., and stopping at Metuchen, Rahway, Elizabethtown and Newark, arriving in New York

in time to transfer goods to the various markets before their opening. The railroad also announced that, "The price for freight will be the same as in the steamboats from Elizabethtown-Point, for all articles of merchandise, marketing, cattle, and etc. (sic). Every exertion will be made . . . to afford those who patronize this line, the dispatch and accommodation which the business portion of this community so much require." In 1842, the railroad reduced the roundtrip fare fifty per cent, from the various way stations to New York, to those merchants who accompany their freight, but the flow of freight never reached the desired proportions.

The New Jersey Railroad never had the same problems with commuters as it had with its freight traffic. Quite on the contrary, because, from the very inauguration of its commutation rates in its early operations, the company's commuting service became a favorite method of traveling. If the harried commuters of today were to ever examine the commutation fares of the New Jersey Railroad, it would be "the last straw," and complete and utter despair would probably result. The commutation fares were unbelievably low. In 1842, the commuter's rate to any point between Jersey City and New Brunswick was only \$75 yearly, or \$50 for any six-months period. Within a decade, further reductions in the commutation rates were made; a yearly ticket from New Brunswick to New York was only \$64, or about 10 cents per trip, while an annual ticket between Newark and New York cost a mere \$50, or a little more than 8 cents a trip. It is no wonder that the number of commuters rapidly increased, when one considers these low rates. For a long while, the commuters were so great in number that the conductors did not even bother to examine a person holding a yearly ticket, if the passenger nodded his head, which was the sign that he held an annual ticket. Naturally this lackadaisical method of collecting fares soon resulted in numerous abuses, as passengers merely nodded whether or not they held yearly tickets. The number of free rides obtained by this method has never been estimated, but it is generally conceded that it was a goodly number on every train while the "nodding policy" remained in effect. Finally, in 1849, the railroad officials realized that perhaps their ticket collecting policy was a little too benevolent. They ordered their conductors to personally examine all tickets.

Unfortunately for the railroad all its troubles were not confined to such minor problems as commuters attempting to secure free passage. On the morning of March 7, 1840, the first serious catastrophe struck the New Jersey Railroad, when flames swept the company's bridge over the Hackensack River, in broad daylight. The two thousand foot truss bridge, which also carried the Newark Turnpike over the river, was completely gutted by flames. The origin of the blaze, which caused an estimated \$25,000 damage, was believed to be a spark of a passing locomotive.

This fire destroyed the only bridge across the Hackensack; so the company was forced promptly to organize a shuttle service on both

sides of the gutted structure, until a new bridge could be constructed. The manner in which the company and its personnel handled this disruption in their normal operations won widespread acclaim from the traveling public. Steam ferry service was instituted between two specially constructed wharfs, with a minimum of delay, and passengers seldom were held up more than twenty minutes in crossing the river.

The construction of a new bridge was immediately begun under the efficient supervision of Major Sykes, the railroad's official engineer. Amazingly rapid progress was made by the contractors and, six weeks to the day after the blaze, the structure was open for rail service. An additional two weeks were required to complete the necessary facilities for the Turnpike traffic. The *Newark Advertiser* praised the rapid completion of the project and said "the new bridge . . . is even more substantial than the old one . . . though there are but two trusses."

The company, in the years 1840-41, had a period of bad luck with bridges. In August 1840, a foot and vehicle bridge, crossing the company's tracks on the outskirts of Jersey City, suddenly collapsed, as a load of hay was passing over the structure, killing the driver. The public was horrified at this minor tragedy and a grand jury was immediately appointed to investigate the accident. The jury finally completed its inquiry and sharply censured the railroad for the dilapidated condition of the structure, but failed to press any negligence charges against the company.

In January of '41, a sudden thaw turned the Meadows into a large lake and interrupted the train schedule for two or three days. For a while, it was feared the company's bridge over the Passaic was going to be swept away by the flood-swollen river. Fortunately the foundations of the structure held against the raging torrent and the bridge emerged one of the two remaining across the river, after waters had subsided.

Incidentally, the winter of 1840-41 was one of the hardest the Newark area had faced. Heavy snows more than once blocked almost every railroad in the east, and made travelers hours late arriving at their destinations. Once again the New Jersey Company won praise from the public for its superior service throughout the winter. As the *Advertiser* said, "The New Jersey Railroad . . . has not lost a trip. This remarkable and creditable fact is owing to the efficiency of its officers and agents."

At this point it should be noted that the New Jersey Railroad was fortunate to have suffered from only several minor accidents, during the early years of its operations. The lack of accidents was certainly a tribute to the officers and the employees of the railroad, who, from the very beginning, strictly obeyed the safety and operating rules that the company developed to protect its passengers. From the first day of operations, the company insisted that the supervisory officers of the company impress upon the operating personnel the absolute necessity of each and every man taking every possible precaution to prevent accidents. "A well adjusted signal system, and minute and constant examinations of the wheels and axles, and all the machinery of the engines

and cars, and of the roads and bridges, are important and indispensable auxiliaries" in the constant battle against accidents, "but the greatest safety is believed to consist in the plan which has prevailed on this road, of impressing and multiplying individual responsibility and care . . ."

Despite the constant precautions by the company, the public's demand for increased speed resulted in several minor accidents on the road. In January, 1837, two accidents occurred in the Bergen Cut within twenty-four hours. Both accidents were caused by rock slides blocking the rails, and darkness obstructing the engineer's view of the tracks, but fortunately none of the passengers was injured.

The year 1838 saw the first passenger inside a company car suffer injuries. This particular mishap occurred because a section of track on the heavily traveled route, from the junction with the Paterson and Hudson to Jersey City, was under repair. The accident was "attributable entirely to a misunderstanding on the part of the engineer," who failed to wait for the Paterson train to pass, and then ran into it head-on, while rounding a sharp curve.

During the early years of its operations, the New Jersey Railroad compiled an outstanding safety record. It was not until the year 1865 that a *passenger* was fatally injured in an accident. Each year prior to 1865, the officers of the road pointed with pride to their fine safety record. In the annual report of 1853, it was announced that over twenty million people had been transported over the railroad, since the opening of the road in 1832. By the Company's twenty-fifth anniversary celebration in 1857, a total of almost twenty-five million travelers had safely traversed the route from New Brunswick to Jersey City, without a single loss of life. In 1864, the passenger total was nearing the fifty million mark, when a serious accident resulted from an open switch, and two passengers suffered fatal injuries.

The safety of the New Jersey Railroad Company won wide acclaim from the public. In the early era of American railroading, the number of accidents, the large majority of which resulted in fatalities, shocked the citizens into vigorous protests against the gross negligence of railway operations. One such demonstration by the people, in 1855, saw the Camden and Amboy Railroad receive a public reprimand. On the twenty-ninth of August, 1855, a New York-bound train of the Camden and Amboy was derailed while attempting to back into a siding to avoid a head-on collision. As a result of the derailment, 23 passengers were killed and 78 injured, in what was one of the worst catastrophes in railroad history, up to that time. The newspapers printed column after column, demanding reforms in the operating rules of the Camden and Amboy and other poorly managed railroads. One of the few major railroads not attacked by the press and the public was the New Jersey Company. The astonishing record of safety of the New Jersey Road, its excellent operating and safety regulations, and well trained personnel were all cited as examples of how a well-managed and safety-minded railroad was operated. The large expenditures of its meager funds, in the first years of its operations, for the latest safety devices, was at last beginning to pay off. Not only had these initial expenditures on pro-

tective measures reduced the early toll of accidents, but a precedent was set, which was to carry through the entire life of the New Jersey Railroad. The public was quick to appreciate the safety of the road, and the corresponding goodwill was a primary factor in the rapid increase in passenger traffic.

When one considers the hazardous circumstances of railroading in this era, according to present day safety standards, it was a miracle that more accidents did not occur. It is interesting to note that, during the early years, the majority of the accidents were minor derailments caused by livestock, cows in particular, which, for some unknown reason, preferred railroad tracks as their favorite places for an afternoon rest. Another custom, which brought grief to railroad engineers, was the astonishingly common habit of gentlemen under the influence of spirits resting on the tracks, oblivious to all approaching trains.

Still another source of despair to the operating personnel was the habit of certain of the hardier passengers riding on the platforms between the cars, and then leaping from the cars, as the train was stopping at the station. Despite the efforts of the conductors, a small percentage of the passengers considered it one of their rights as paying customers to jump off the trains. In the year 1852 alone, four passengers were killed as they brazenly leaped from the cars while the train was in motion.

In February, 1841, new financial trouble overtook the New Jersey Company. For the first time since its initial dividend in July, 1835, the Board of Directors decided not to declare the usual semi-annual dividend. This failure to maintain the usual dividend was only decided after a long and careful audit of the company's finances by the Directors. A complete report of the company's position was printed in a large advertisement in the columns of the *Newark Advertiser*.

The Directors, in their report to the stockholders, pointed out that the railroad had paid dividends totaling 27%, since the opening of the road, and retained only sufficient funds to meet the usual operating expenses. Therefore, the company had only a small surplus with which to pay the additional expenses of the disasters of the past year. The previously mentioned destruction of the Hackensack Bridge and the consequent loss of traffic reduced the amount of cash fares available; and the usual revenue of the Passaic and Hackensack Bridge stock was absorbed by the rebuilding of the Turnpike Bridge over the Passaic, at a cost of \$12,000, only to see the rebuilt bridge carried away in an ensuing flood, a total loss. The bridge had to be entirely rebuilt out of the railroad's capital funds. The report once again emphasized the unexpected costs which the company encountered in the initial construction of the railroad—far beyond the original estimates. The Bergen Cut and the sinking of the embankments crossing the Meadows were cited as additional capital expenditures far above the estimated costs. The purchase of stock in the various bridge and turnpike companies required funds that could have been diverted to more productive projects. The directors also pointed out that the recent reduction of fares had eliminated much competition from other routes, and promised increased receipts in the near future.

The Directors also appended to their report the following statement of the finances since the opening of the road.

	Gross Receipts	Net Receipts
April 1, 1835 to July 1, 1835	\$14,434.44	\$6,434.25
July 1, 1835 to January 1, 1836	38,581.03	11,104.58
January 1, 1836 to January 1, 1837	134,037.48	12,158.44
January 1, 1837 to January 1, 1838	125,690.19	19,398.94
January 1, 1838 to January 1, 1839	110,997.09	18,560.05
January 1, 1839 to January 1, 1840	219,502.27	42,972.73
January 1, 1840 to January 1, 1841	200,168.74	36,276.87

Apparently the stockholders accepted the foregoing report of the Directors because, in the annual election of officers on June 4, 1841, the following directors were returned to office, in what could be called a vote of confidence: President Darcey, Stephen Whitney, Elihu Townshend, J. Phillips Phoenix, Dudley S. Gregory, Adam Lee, and J. P. Jackson. David W. Vail and Francis Griffin replaced Roswell Colt and George P. Molleson, both of whom resigned.

The July 4th weekend of '41 saw a record breaking number of passengers carried in the New Jersey Railroad's cars. A total of 4,973 people were carried on the Newark-Jersey City Line. On the New Brunswick Accommodation Line and the Philadelphia through-route almost 10,000 additional passengers were carried.

The above record breaking crowds appear to be the culmination in the sharp rise in passenger traffic and, on July 9th, the Board of Directors resumed the payments of dividends. On this date, a three per cent dividend was declared, payable on the twenty-sixth of July. "As proof of the revival of business intercourse in the community, and as a testimony, though not conclusive, in favor of reduced prices . . . we annex the following statistics . . . from the company's books."

Passengers carried

From January to July 1839—109,217 on way line.
 From January to July 1840—118,005 on way line.
 From January to July 1841—175,083 on way line.
 From January to July 1839— 35,320 on Philadelphia Line.
 From January to July 1840— 36,477 on Philadelphia Line.
 From January to July 1841— 44,299 on Philadelphia Line.

The rapid increase in traffic on the New York-Philadelphia route led to an investigation by a committee of the Legislature, into the matter of transit duties and taxes owed to the State by the New Jersey Railroad and the Joint Companies. In a report submitted on February 8, 1841, the committee found that the entire misunderstanding between the railroads and the State was centered around "the true meaning and construction of the provisions of certain laws of this State, reserving to the State certain transit duties and taxes, to be paid by said companies."

The particular differences of interpretation between the New Jersey Railroad and State revolved around section 18 of the company's charter. It should be recalled that this section of the charter required the railroad to pay into the State Treasury, within five years after the completion of the road, "a tax of one quarter of one per cent upon their capital stock paid in; and after the expiration of ten years, a tax of one half of one per cent upon the true amount of capital stock of the company." In addition to the above levy, the railroad was to pay transit duties at the rate of eight cents per passenger and twelve cents for every ton of freight carried between the states of New York and Pennsylvania.

The railroad maintained that it was not required, under section 18 of their charter, to pay the stated taxes until five years after the completion of the road. The State Treasurer, however, disputed the railroad's contention and demanded retroactive payments, from the date of the road's completion. After studying the construction of the charter provision, the committee admitted its language was "somewhat ambiguous" but was of the opinion "that the just construction of the act requires that the said periods of five and ten years should be reckoned as commencing at the completion of the road," and the railroad must pay the aforementioned taxes as of that date.

The second disputed tax payment between the railroad and the State also centered around section 18. The State maintained that the company was bound to pay the transit duties on all passengers and freight transported over the New Jersey Railroad from Jersey City to its junction with the Camden and Amboy, south of New Brunswick, including all intermediary traffic. The railroad, on the other hand, insisted that it only was required to pay duties on goods between Jersey City and its southern terminus, or its junction with the Camden and Amboy. The committee admitted that this was "a more doubtful question" than the other, but once again ruled in favor of the State. As a result of these decisions by the committee, the Legislature passed a joint resolution, which clarified the disputed clauses and authorized the State Treasurer to accept payment of the required transit duties as of January 1, 1839, until the expiration of a five year period from that date, as "full satisfaction of all claims for transit duties of the State against said company . . ." This resolution also required the New Jersey Railroad Company to commence paying the disputed capital stock taxes, with January 1, 1839, as the beginning of the five- and ten-year periods.

However, in February, 1846, the Legislature passed another joint resolution requiring the New Jersey Company, on the first of January each year, to pay into the State Treasury \$4,000, as complete satisfaction of all capital stock assessments. This act also required the treasurer of the company to make quarterly returns to the State on "the whole amount of moneys received by the said company from passengers," instead of only those receipts the railroad previously considered subject to transit duties.

After these disputes with the State were settled, the New Jersey Railroad Company embarked on what might be safely called its "golden era." The distressing period of financial instability became only a

memory in the minds of the early supporters. The railroad had at last achieved prosperity, which, as Lane says, "made the manner of finance as easy as it had formerly been difficult." The New Jersey Railroad and Transportation Company's stock became very much in demand, as the company maintained a steady dividend, averaging about seven per cent per annum, with every prospect of continuing an even larger return. By the early 1850's, the once-dominant holding of Nevins, Townshend & Company had decreased from almost 90% to less than 10%. The number of shares held by local citizens had increased more than twelvefold over those owned by the original forty-six shareholders.

With the railroad on firm financial basis, the company officials were now able to direct all their efforts toward improving the physical equipment and rolling stock. In 1843, the company purchased two new 56-seat passenger cars to use on their line between New Brunswick and Jersey City. The new cars were "hung upon Wood's improved iron trucks," and were "provided with large and luxurious high-back mahogany seats, lined with drab cloth." The exterior was ornamented in a "chaste and beautiful manner. For elegance and comfort they were superior to any yet constructed." Previously the railroad had ordered Bissel's Atmospheric Springs attached to all their through cars, to insure its passengers the most comfortable journey possible.

In an effort to provide its passengers with the best of service, the railroad increased the number of daily trains on the Newark Accommodation Line, as the number of passengers steadily grew until, by 1847, it was running ten round trips, exclusive of way and through trains, between Newark and Jersey City daily. As an additional accommodation to the public, the New Jersey Railroad began to run frequent excursion trains. An advertisement in June, 1846, offered a Fourth of July excursion to Philadelphia at reduced rates, "to afford an opportunity . . . to the citizens of Newark to visit their friends in Philadelphia." The round trip fare for the special excursion tickets was \$4—half the regular fare.

For some reason, the bridges of the New Jersey Railroad were a constant nemesis to the Company. In 1846, the Hudson County Grand Jury charged the Passaic and Hackensack Bridge Company, which was controlled by the New Jersey Company, with maintaining the bridge over the Hackensack River "without due regard to the safety of those who travel on the Turnpike, by bringing their track into close connection with it (foot and vehicle traffic) and erecting in place of the old bridge across the Hackensack a new one for the common use of both locomotives and horse carriages, so as to render traveling on the old road disagreeable and insecure." The Grand Jury then suggested that a new bridge be erected "separate and apart from the Railroad." President Darcey promptly protested the Grand Jury's Presentment, but, after lengthy litigation, the courts ordered the Bridge Company to construct a second structure over the river. In order to comply with the court decree and to make other necessary capital improvements, the New Jersey Railroad made an application to the Legislature for permission to increase its capital stock another \$500,000. On February 4,

1848, the Legislature passed a supplement to the railroad's charter, authorizing the requested increase. This new issue of stock was rapidly apportioned among the stockholders, who eagerly awaited the chance to increase their investment in the railroad.

The citizens of New Brunswick decided that, if Hudson County could complain about the railroad's bridges within its borders, the City of New Brunswick could take the necessary measures to force the New Jersey Company to improve the abandoned Albany Street bridge over the Raritan River. The City Council maintained that the combination railroad and vehicle bridge over the river was insufficient to accommodate the growing intercourse of New Brunswick with the surrounding territories. The New Jersey Railroad steadfastly refused to incur the expense of reconstructing the Albany Street bridge, abandoned ten years earlier, when the tracks were laid over the new combination rail-vehicle structure to carry the railroad into the city. Despite threats of the local council to pass and enforce ordinances restricting the speed of trains through New Brunswick to a mere four miles per hour, and to prohibit the stopping of trains in the city's streets, which would practically force the railroad to abandon its route through one of the most important cities along its route, the New Jersey refused to comply with the council's request. Finally, the City decided to petition the Legislature to force the railroad to turn the Bridge Company's charter over to the City. The Legislature failed to take any action on the proposal; so the citizens of New Brunswick gave up in despair, realizing they would suffer as much if not more than the railroad, if the proposed restrictive ordinances on passing trains were ever enforced. The dispute was finally settled in 1853, when a new company was formed, with the New Jersey Railroad and Transportation Company as majority stockholder, and the long sought bridge was constructed at the Albany Street site. The new structure was an immediate success and the railroad reaped a long series of dividends from its subsidiary, before it was finally sold to the County Board of Freeholders, in 1875.

While the Company was negotiating with the City of New Brunswick, the Passaic River bridge was another trouble spot. On March 21, 1848, a train bound from Jersey City to New Brunswick ran through a flag signal and hit the open draw of the Passaic bridge. The new locomotive, "Stephen Whitney," which was the most expensive and largest engine owned by the road, plunged into the water, after glancing off the draw. Fortunately just the tender and the baggage car followed the "Whitney" to the bottom of the Passaic; the string of passenger cars halted miraculously at the edge of the open bridge. The sole casualty of the near catastrophe was an extra fireman riding in the engine cab; the rest of the crew managed to leap clear to safety.

The steady growth of travel on the New Jersey Railroad again forced the company to enlarge its passenger facilities. In the summer of 1848, the railroad constructed a new depot in the south ward of Newark, near the Elizabeth city limits. Commencing on July 17th, all trains, except the through trains, stopped at this new station. Also in the year 1848, a Trenton Accommodation Line was instituted for the

benefit of passengers and freight destined to points south of New Brunswick. The new service was designed to relieve local stops of the New York-Philadelphia express trains, between New Brunswick and Trenton.

While the New Jersey Railroad was striving to improve its service within the State, citizens of New York and Pennsylvania decided to seek the aid of the Federal Government to improve the service on the through route and to force the Camden and Amboy to lower its fares between New York and Philadelphia. Despite numerous memorials by various out-of-state merchant organizations, the protests to Washington went unheeded in Congress, and these abortive efforts against the Monopoly were quickly forgotten.

After seeing the various protests to the Federal Government ignored, the anti-Monopolists in New Jersey decided on a final all-out fight against the high fares imposed by the Camden and Amboy Railroad. The rates on the New Jersey Railroad were not opposed because it was felt that the officers of this company had done everything within their power to lower their fares under the unfavorable division of fares mentioned early in this chapter.

The anti-monopoly attack was led by the *Burlington Press*, which published a series of letters directed at the Legislature. These letters pointed out "the alleged malfeasances of the railroad monopoly. Thirty-five of the principal roads in the United States showed an average of 2.85 cents per mile, while the Camden and Amboy charged 4.54 cents per mile . . ." on the through traffic fares. It was also pointed out in the attacks on the Monopoly that the State was being defrauded of thousands of dollars annually in transit duties, because the Joint Companies were submitting inaccurate and insufficient returns to the State Treasurer. An additional charge by the *Press* and other New Jersey papers even accused the Camden and Amboy interests of falsifying their annual reports to their stockholders, to conceal various profitable operations.

The citizens of New Jersey united behind the accusations of the press, and demanded that the Legislature investigate the alleged illegal actions of the Joint Companies. The pressure of public opinion finally forced the appointment of a joint legislative committee "with full power and authority to investigate . . . into all the business and operations" of the Joint Companies. After a detailed study of the accused companies, which took the better part of a year, the committee reported its findings to the Legislature. The long and eagerly awaited report was a great disappointment to the anti-Monopolists, who had hoped to force the Legislature to repeal the Camden and Amboy monopoly grant. Although the committee found numerous discrepancies in the railroad's books and reports, the general tenor of the investigation was favorable to the company, and failed to recommend any legal action against the Monopoly.

Naturally the anti-Monopolists were bitterly disappointed at their defeat and maintained that "the report was a eulogy rather than an investigation." However, it should be noted that *Burlington Press* and

other periodicals' efforts against the Camden and Amboy were not entirely in vain, because, while the legislative investigation was studying the various charges, the railroad quietly reduced the New York-Philadelphia fare from \$4.00 to \$3.00, one way. Why the Camden and Amboy officers ordered this reduction was not publicly known, but it was generally surmised that the company was preparing to win the public's goodwill to their side, if any unfavorable action should have resulted from the committee's investigations. The reduction in through fares soon had the desired effect. After a brief outburst against the previously mentioned Report, the anti-monopoly cause lost most of its former enthusiastic public support and the fight against the Camden and Amboy Railroad subsided in the latter part of 1850.

The mid-century mark is an excellent point at which to survey what influences the New Jersey Railroad and Transportation Company had in the growth of the Jersey City-Newark area. The railroad's northern terminus, Jersey City, despite its excellent site facing the Port of New York, was a small village of less than 3,000 inhabitants, in 1840, but, within a decade after the opening of the railroad, its population had more than doubled and, by 1850, totaled 6,856. The City of Newark rapidly expanded its boundaries and population sufficiently to retain its position as the largest city in New Jersey. In 1836, shortly after the first trains entered the town, Newark had 19,732 citizens; by 1850, its population had grown to 38,894. Although the growth of these towns can not be entirely attributed to the New Jersey Railroad, it must be remembered that a railroad was by the far the most satisfactory means of intercourse in the early nineteenth century. As one editor said, "Truly . . . rail roads are convenient. The saving to the country in labor, time and money, resulting from the use of railroads, is little thought of, but, in truth, the measure can scarcely be tested but by a return to the primitive modes of transportation." Without the New Jersey Company or some other railroad, one may be sure that the aforementioned towns would never have been able to develop in this rapid manner. To the average individual of the 1850's, the stage coach era of the early nineteenth century was a thing of the distant past. Railroads provided year-around transportation with low rates and comfortable traveling conditions, and the stages were becoming just another memory to the seasoned traveler.

In an effort to provide the enlarged populace along its right-of-way with the best available in rail service, the New Jersey Railroad spent large sums of money to improve its facilities and service. The large terminal at Jersey City, which was formerly a dark and gloomy place, was remodeled. New skylights were placed in the roof and additional windows were built to improve the ventilation. The south side of the original building was reconstructed to provide an enlarged freight shed. When the remodeling was completed, the building was said to be as neat and convenient as any railroad depot in the East.

Despite the company's efforts to improve traveling conditions on its line, fate once again intervened. On September 16, 1851, the bridge over the Hackensack River was again destroyed by fire. After the blaze

of 1840, the company had maintained watchmen twenty-four hours a day to extinguish any sparks from passing locomotives. Nevertheless, the combined efforts of the watchman and the Newark and Jersey City Fire Departments failed to save the structure from complete destruction. Once more, the railroad was forced to revise its train schedules and make arrangements for an improvised shuttle service.

The New Jersey Company's officers promptly let the necessary contracts for a new bridge. Rapid progress was made and, in the remarkable space of twenty-one working days, the new span was completed. On October 14th, three engines, weighing the total of sixty tons, were coupled together and slowly driven across the bridge in a trial run. To everybody's relief, the test revealed no timber movement and the structure was declared safe for passenger service. The afternoon train to Philadelphia was the first to resume its regular schedule and, within twenty-four hours, trains were operating according to the original timetable.

It was during 1853 that the New Jersey Railroad began to negotiate a series of agreements with other railroads, which permitted non-competing roads to use the New Jersey Company's track into the Jersey City terminal. On October 13, 1853, the New Jersey Railroad concluded a contract with the Morris and Essex Railroad Company "for the purpose of insuring to the Morris and Essex . . . immediate and direct access by railroad carriage, to and from Jersey City and the city of New York . . . and between the city of Newark and the City of New York . . ."

Under the terms of the 1853 compact, the Morris and Essex agreed to pay to the New Jersey Road twenty cents for each passenger transported over the tracks between Newark and Jersey City. The charge for the transportation of freight was to be determined by the current rates that the New Jersey Company was charging the Paterson and Hudson Railroad, according to their 1834 contract. In view of the large income to be derived from the Morris and Essex traffic, the New Jersey Company promised to construct a new bridge over the Passaic River and a spur up Broad Street, in Newark, to the Morris and Essex right-of-way. It was also stipulated that the New Jersey Railroad would build a new dock and coal depot on the Hackensack River, and enlarge its freight shed at Jersey City, if the additional merchandise from the Morris and Essex should be of such volume to require an addition to the building.

To fulfill its obligations of the 1853 agreement, the Directors of the New Jersey Railroad and Transportation Company promptly let the contracts for the required bridge across the Passaic. Unfortunately the construction of the new viaduct was more difficult than originally contemplated. The new structure and spur connecting the two railroads was finally completed in 1854, at a cost of nearly \$200,000. According to the directors, "The expenditure for this connection was greatly augmented by the heavy charge for the right-of-way, the expensive viaducts over the turnpikes and roads, and the costly bridge over the river, with pivot draws of two openings of fifty feet each." Because of this un-

foreseen expenditure, the New Jersey Railroad was unable to secure the anticipated return on the Morris and Essex traffic, until the cancellation of the contract, in 1863, resulted in the sale of the viaduct to the Morris and Essex, for the original cost of \$200,000.

During this period of protracted negotiations with the Morris and Essex, the Paterson and Hudson Railroad Company merged with several other railroads to form the New York and Erie Railroad. As a result of this consolidation, the agreement of 1834, between the New Jersey Railroad and the Paterson and Hudson, was revised and brought up to date. In the new contract between the railroads, the Erie agreed to pay the same rates, six cents a passenger and twelve cents a ton, for every train passing over the New Jersey's tracks. However, in the new stipulation, which was signed in the fall of 1853, the New Jersey Company permitted the Erie, upon the token payment of one dollar, to increase the gauge of the track, from Jersey City to the junction of the two roads west of Bergen Hill, to six feet. This widening of the track to accommodate the larger gauge of the Erie, the New Jersey's gauge being only four feet-ten inches, was accomplished by "laying down a rail on one side of each of the tracks now in use, so as to form in conjunction with the inside rail of each track . . . two tracks six feet in width . . ."

By December 1853, the wider cars of the New York and Erie were proceeding over the enlarged tracks. At first, minor interruptions were experienced by locomotives running off switches, but this was soon remedied and upward of thirteen Erie trains daily passed from Jersey City through the Bergen Cut. The sole difficulty of the new arrangement was caused by the narrow cut at Bergen Hill, which allowed the wider cars of the Erie very little leeway when passing through the winding passage. Surveys were ordered to determine the cost of widening and straightening the tortuous route, which, in its original state, was considered a remarkable engineering feat. In February, 1853, it was decided to proceed with the plans for the enlargement of the cut. The State legislature granted permission to increase the New Jersey Railroad and Transportation Company's capital stock an additional \$500,000, "to widen and straighten their railroad route or cut through Bergen Hill, to extend their road by elevation . . . to give full facilities to the increasing business of the several Railroads passing . . . to and from the city of New York." However, after the Legislature had granted the company the necessary permission to enlarge the Bergen Cut, the Board of Directors decided that the additional capital could be used to better advantage, if the money were spent on a variety of projects; so the projected improvements to the Cut were forgotten. The Legislature was then petitioned to permit the new capital funds to be used at the Directors' discretion, and the authorities granted the request.

The New Jersey Railroad was not long in spending its new funds because, in 1853, the company purchased the property and privileges of the Associates of the Jersey Company, which embraced their exclusive ferry and water rights to the entire Jersey City waterfront. The total cost of the Associates of the Jersey Company was \$485,000—the largest

single sum ever expended by the New Jersey Railroad and Transportation Company on property. However, it was only after a detailed study of the present and future needs of the railroad had impressed upon the Directors the importance of securing the right to extend the railroad's terminal and ferry facilities that the Board's approval was secured to purchase the franchise.

The purchase of the property was completed on August 1, 1853, and the deed was conveyed to the railroad on that date, after eminent legal counsel confirmed the railroad's right "to reclaim lands under water, in front of the original boundaries . . . for the erection of buildings and improvements." The Common Council of Jersey City also gave their sanction to any such large scale improvements that the Jersey Railroad might undertake on the waterfront. With the weight of legal sanction on their side, the conveyance of the deed was regarded by the Directors with general satisfaction.

Plans were immediately drawn up to extend the terminal's facilities and work was commenced in the late fall of 1853. The ferry terminal was completely redesigned and enlarged to provide seven slips, with equal facilities on the New York shore. With the new piers, it was possible to maintain continuous service with the company's six first class ferries. In the winter, such rapid service was a great aid in overcoming the hazards of ice-blocked passages.

The capital investments of the New Jersey Railroad did not stop with the purchase of the Jersey City ferry franchise. In 1854, the officers of the company inquired into the possibility of investing some of the railroad's funds in branch or tributary roads. After obtaining the stockholders' consent, it was decided "to aid branch roads of satisfactory merit, so far provided with local subscription to their capital as to ensure one-half of their completion, by leasing the same at six percent, and operating the branch in connection with the main line," and thereby increase the operating scope of the New Jersey Railroad and provide additional revenues, both from the tributary roads and the main line.

The first branch railroad to receive the assistance of the New Jersey Company's resources was the little Millstone and New Brunswick railroad. It was decided by the Directors, in the latter part of 1853, to invest in one-half of the capital stock of the projected road, which was to run from the farming village of Millstone, six miles west of New Brunswick, into that city. Despite the rather short length of this road, it ran through a rich agricultural, dairy, and milling section of the State, and was enthusiastically supported by the residents of the area. The public quickly subscribed to their portion of the \$100,000 stock issue. Since the construction of the right-of-way presented no special engineering problems, the tracks were opened to the public on December 23, 1854.

The Millstone and New Brunswick road lived up to the expectation of the Directors and, in the first four months of operations, earned \$8,747.98, of which the New Jersey Railroad received \$5,832.70. The operating expenses were low because the numerous mainline way trains were simply run over the branch road before starting or upon completing their regular runs. After the initial operations leveled off, the Millstone

and New Brunswick Railroad returned to the parent company annual earnings of between three and five thousand dollars on their \$50,000 investment. By 1860, the road was carrying an average of 15,000 passengers and 8,000 tons of freight yearly.

In spite of its numerous capital expenditures for property, tributary roads and ferry slips, the railroad did not forget about its obligations to the traveling public. The officers of the road were continually striving to keep abreast of the latest developments in railroading, in an effort to provide their passengers with the latest equipment of the rapidly expanding railway industry.

In the early 1850's the company purchased seven new locomotives. These came from the Paterson shop of Rogers, Ketchum and Grosvenor, with the exception of two Danforth, Cooke & Company locomotives, purchased in 1853. Typical of the new engines was the "Governor Southard," built in 1854, by Rogers, Ketchum & Grosvenor. She weighed 22 tons and was equipped with 14½ in. cylinders having a 22 inch stroke. The new locomotive also had four 6-foot drivers and was a wood burner. The Danforth, Cooke engines also burned wood and had 6-foot drivers, but their cylinders had 15 inch bore with 20 inch stroke.

To increase the passengers' comfort, the New Jersey Railroad constructed its new cars, after 1854, with Atwood patent method of ventilation. This innovation in the railroad field consisted of merely covering the sides and roofs of the car platforms, so as to make the passenger cars into a single unit. The tender was equipped with built-in vents, which sucked in a continuous stream of fresh air, which was forced, by the forward motion of the train, to circulate through the cars, the doors of which were left opened. The results of the Atwood system, according to an observer, left "the insides of the cars . . . totally secluded from the dust and hot air outside." The only complaint of this early "air conditioning system" seems to be that occasionally the air became a little stuffy by the time it reached the rear cars.

The year 1854 saw another new service introduced—a ladies car was placed on all trains. The advertisements emphasized that the special cars would be marked with appropriate signs and were for "the exclusive use of the ladies and their companions," thereby relieving "the ladies from the disagreeables of tobacco juice and contact with the grosser sex, which, it is well known, they do so much abhor."

In an effort to provide a smoother, faster and safer ride, the mainline roadbed was rebalasted and in many sections reconstructed to overcome the soft and spongy ground. Larger ties, nine feet in length, laid on top of a stone and gravel ballast, were found to provide the most satisfactory service and riding comfort. The vastly improved roadbed also paved the way for the introduction of heavier and more powerful locomotives in mainline service.

The use of improved ballasting led to another important advancement. In 1854, the Directors ordered that the double tracks be extended from their present termination, at Newark, to the junction of the Camden and Amboy, on the outskirts of New Brunswick. In announcing the extension of the double tracks, the Board made the following

statement, "On so great a thoroughfare, with so many heavy trains, true economy enjoins the perfecting of our work, in every judicious way, not only to provide facilities but to avoid accidents, and for this purpose the extension of double tracks . . . are deemed of great interest and importance, to the public and the Company."

During the summer of 1855, the roadbed between Newark and Rahway was prepared and reconstructed to support the proposed dual tracks, and by December of the same year, the railroad announced that the new tracks were opened for regularly scheduled travel. At the same time, a large portion of this rebuilt section was relaid with new and heavier rail, at a cost of \$37,894.37. However, the lack of adequate funds prevented the completion of the double track to New Brunswick, until the fall of 1859. The section of track from Rahway to New Brunswick was laid with a new type of seventy pound rail developed by the Trenton Iron Works. A congratulatory festival was given by the city of New Brunswick for the Directors and officers of the road, on the completion of the project.

The additional speed, comfort and safety of the double track permitted a revision of the company's timetables and an expansion in local service, because the old danger of head-on collisions, resulting from missed signals, was alleviated by the two sets of rails. In fact, the Directors of the New Jersey Railroad were so enthusiastic over the numerous advantages of the new improved mainline facilities that they made what they termed, "an investment of permanent economy and advantage to the company," by purchasing a farm of a hundred acres, on the outskirts of Metuchen, with a large gravel pit capable of supplying the company's future gravel requirements. The total cost of the farm and the spur from the pit to a junction with the mainline, at Campbell's Depot, a distance of a mile and three quarters, was only \$21,164.59. The saving in maintaining the road's double tracks with clean ballast was estimated to be at least \$10,000 per annum, as a result of purchasing of the Metuchen gravel supply.

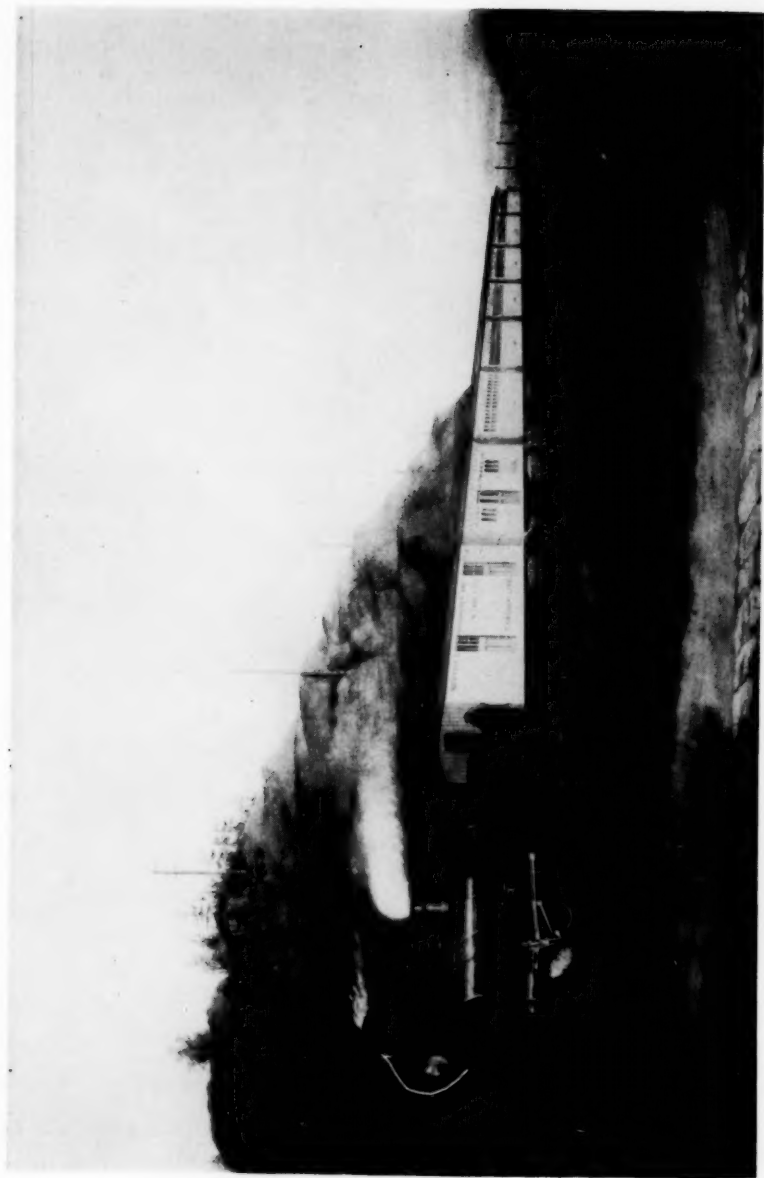
Closely connected with the recent improvements to their roadbed was the proposal of the railroad to erect a new bridge over the Passaic River, at Newark. When the initial route through Newark was proposed in 1833, a direct line was contemplated from a bridge near the Commercial Dock to the Elizabeth line, and the necessary land for such a route was acquired by the company at that time. However, before the construction of the railroad was started, the previously mentioned commercial and shipping interests forced the railroad to relocate their crossing of the Passaic, to avoid obstructing vessels on the river. As a result of this opposition, the first Board of Directors ordered that the bridge be constructed at Centre Street, to avoid any possible law suits by the navigation interests. In order to comply with the Directors' orders, the engineers were forced to include two very sharp curves, one at Centre Street and the other near the Morris Canal, in the bridge approach. As traffic on the railroad subsequently increased, these two curves proved to be a source of many unnecessary delays, because operating rules demanded that all trains traverse the curves at sharply

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The First Through Mail Train between New York and Washington.
N. J. R. R. & T. Co. #30, "A. L. Dennis", Jersey City L. W. 1862. Cylinders 16x24" DD 66".

Courtesy Ry. & Loco. Hist. Soc.

reduced speeds. Despite the safety precautions, this section of track remained a definite hazard to the public safety; so, at the annual meeting held June 4, 1855, the following resolution was unanimously adopted; "Resolved, That in the opinion of this meeting, a great improvement to our road, and accommodation of the traveling public, will be attained by the construction of the Railroad Bridge across the Passaic River, and the straight and direct line of railroad at Newark."

At the request of the company's Directors, the Legislature passed a supplement to the company's charter, in April, 1855, authorizing a \$500,000 increase in their capital stock, to build the bridge at the Commercial Dock, "provided that, within one year from the completion of the bridge authorized . . . the present Railroad Bridge over the Passaic River at Centre Street, and the tracks between said bridge and Market Street, be removed, so that no interruption to navigation : . . on the Passaic River shall continue . . . on account of said bridge . . ."

In spite of the Legislature's approval of the new Newark bridge, actual construction was hindered by the protests of the navigation interests. However, at this time, any attempts to prevent the completion of the sorely needed bridge would be actively countered by legal action by the railroad. As was expected, an injunction to prohibit the erection of the viaduct was obtained by the maritime interests. The injunction was promptly appealed by the New Jersey Railroad to the United States Circuit Court. Unfortunately a crowded docket and the lengthy arguments by the counsels for both parties prevented an early verdict by the Court.

Finally, on September 22, 1857, Federal Judge Grier handed down a decision in favor of the Transportation Company. The Court's opinion in the Newark Bridge Case was an important one and laid down a new precedent, which, when appealed by the complainants in this case, was upheld by the United States Supreme Court. Mr. Justice Grier reasoned in his decision that "time, which changes all things, has produced a great change in the circumstances. Newark has become a great city. Locomotives moving at a velocity of forty miles an hour, which were then considered but a dream of the projector, are now established facts. Curves have given way to straight lines . . . The conflicting interests, which inexperience and ignorance had originally produced, need no longer to be propitiated for the sake of peace. The people of Newark no longer object to having the bridge located where it was originally intended to place it, and the people of New Jersey, by their Legislature, have determined that it would be beneficial to the public to have . . . the railroad . . . pass through the city by the shortest route—by a straight line, and not with curves."

With the legality of the legislative act upheld by the Circuit Court, work was immediately begun on the bridge, only to be halted by the Directors until the new appeal of the plaintiffs to the Supreme Court was acted upon. Finally, in 1862, the decision of the lower court in favor of the railroad was upheld and work on the bridge was resumed.

In the midst of the Newark Bridge dispute, the New Jersey Railroad and Transportation Company celebrated its twenty-fifth anniversary. It was on this occasion, in 1857, on the railroad's completion of a quarter of a century of public service, that the Board of Directors issued an elaborate annual report reviewing the road's development. One of the most interesting aspects of the culmination of over two decades of operation was the comparison of the statistics of the first several years and those contained in the 1857 Annual Report. In 1857, the New Jersey Railroad carried 2,278,913 passengers, exclusive of commuters, which was a sharp increase from the 200,000 fares transported in the initial year of 1835. The respective gross receipts for those two years were \$910,637.61 and slightly less than \$100,000. By 1857, the paid in capital of the Company had grown from original subscription of \$75,000 to \$3,485,000. The number of daily trains passing over the New Jersey Railroad's tracks, in 1857, numbered 103—a far cry from the "Eight trips each way, every day" era of the early 1830's. By the quarter century mark, the stockholders were even beginning to secure a fair return on their investments, averaging 10% per annum; a welcome relief to early shareholders, who considered themselves lucky if they got a 3% annual dividend. However, by 1857, an original investment of a hundred dollars, back in 1832, had only returned a total of seventy-one dollars, or less than 7% a year.

In concluding their silver anniversary report, the Board of Directors summarily stated, "Our enterprise was designed for no evanescent purpose;—its object and aim are identified with the true and enduring interests of the community, and while receiving public patronage, it reciprocates with cheerful alacrity its accommodations and benefits. Thus has the community around us and our institution gone hand-in-hand, growing with the growth and strengthening with the strength of each other, during the last quarter of a century, and by the substantial expansion and prosperity of the past, giving assured promise of its continued advancement."

In effort to keep its rolling stock at the highest possible peak of efficiency, the New Jersey Railroad began to experiment with coal as fuel for its locomotives. Prior to the purchase of the "Phoenix" No. 24, in the summer of 1856, the road had used only wood burning engines. The "Phoenix" was a Wm. Mason and Company product, having four five-and-a-half foot drivers, fifteen by twenty-two inch cylinders, and the latest approved Boardman patent boilers. To obtain fair and accurate results in their tests to determine the relative performance of wood versus coal as a fuel for their motive power, the road also purchased the Rogers, Ketchum & Grosvenor's latest wood-burning model, in 1856, which it named "Gov. Pennington" No. 25, to run in fair competition with the coal-burning "Phoenix," on the Philadelphia through route. The findings of the initial studies of the two engines "proved quite satisfactory, and the result exhibits the comparative cost of coal and wood, (estimating the former at \$6 per ton and the later at \$6 per cord) to be 10 64-100 cents per mile for coal and 15 14-100

cents per mile for wood, being an increased expense of fifty per cent for wood over coal."

Apparently the officers of the New Jersey Company were sufficiently impressed with the economies effected by using coal instead of wood, because the next locomotive purchased by the road was another Mason and Co. coal-burner, the "A. O. Zabriskie," No. 26. This new engine, purchased in 1858, had the same specifications as the "Phoenix," but the Boardman boiler was redesigned to avoid some of the inherent faults of the older locomotive. With her innovations, the "A. O. Zabriskie" further reduced the fuel costs to a new low of 10 cents per mile. The first-introduced "Phoenix," after 40,602 miles of high speed express service, showed an average per mile cost of 11.2 cents; while the wood-burning "Gov. Pennington" ran a poor last, with an average per mile fuel cost of 19 cents.

In November, 1858, the Directors' Annual Excursion saw the introduction of the "Gov. Dickerson," a Breese, Kneeland & Co. locomotive, purchased in 1856, as the first New Jersey engine to be converted from wood to coal by the use of Gregg's Patent Improvement. The Gregg Improvement simply involved a few minor modifications of the boiler and smoke-stack, and the construction of a brick arch in the fire-box. This simple conversion from wood to bituminous coal initially cost only \$150, and, after the mechanics became more experienced, the installation costs of Gregg's adaption were reduced to \$100. After its alteration, the "Gov. Dickerson" performed excellently and showed a very low per-mile fuel consumption cost of 10.5 cents. The original coal engines continued their economical operations in all types of service and, in the year ending July, 1858, the "Phoenix" and "Zabriskie" showed fuel costs of 9.8 cents per mile and 7.5 cents per mile, respectively.

Despite constant experimentation and improvements, the wood-burning locomotives proved to be relatively expensive to operate, when compared to the newer coal engines. During 1858, the fuel costs averaged 17.5 cents per mile, which was slightly better than the 20.1 cent cost the previous year. It was statistics like these fuel cost figures which doomed the wood-burning locomotives on the New Jersey Railroad. The death sentence was pronounced in the 1859 Report to the Stockholders, when the officers concluded that, "The use of coal as a fuel for the locomotives engines continues to be . . . more favorable than wood, and encourages the gradual substitution of the former for the latter."

The new policy of the replacement of wood-burning motive equipment with coal consuming locomotives began immediately. With the exception of the purchase of the Jersey City Locomotive Work's "Wolcott" No. 28, in 1860, all the new engines purchased in the period from 1858-1865 were coal burners. The majority of this new equipment was built by the Rogers Locomotive and Machine Works, successors to the old Rogers, Ketchum and Grosvenor organization, and proved to be extremely satisfactory engines.

In the late 1860's, a sharp rise in the cost of coal temporarily forced the New Jersey Railroad to revert to wood-burning motive power. In the brief period from 1865 to 1866, the company bought five wood burners, but, shortly thereafter, the cost of wood increased and prevented any substantial savings from the use of wood. After 1866, only coal locomotives were purchased and anthracite began to replace bituminous coal as the major fuel on the road.

In 1858, two new innovations were introduced by the New Jersey Railroad. The more important of the two developments was the Wood's Patent Improved Railroad Safety Switch, which was invented by one of the railroad's engineers. This new improvement eliminated the danger of locomotives jumping the tracks while passing over a switch, even if the switch should accidentally be set against the on-coming train. According to the officers of the Company, "the proper appreciation of the safety of passengers, and the economy in repairs of engines and cars, should prompt the general use of this improved safety switch." In keeping with this statement, the installation of Wood's Safety Switch was undertaken on all mainline trackage.

The second of the two innovations was the placement of gas lights in passenger cars on the New York-Philadelphia express route. The use of gas instead of sperm candles won widespread acclaim from the traveling public. Gas light was cheerful, bright and uniform, and far superior to the gloomy light of the smoky candles or oil lamps. The railroad was also pleased with the gas light because it estimated that a saving of \$2.50 could be achieved on each through train, and additional gas units were ordered to place in cars of all way trains.

Before entering the final phase of the New Jersey Railroad's activities, it is interesting to note the large increase in passenger travel in the period from 1849 to 1859. The following table shows the additional trains that the railroad was forced to put in service to keep abreast of the public's demand for improved schedules:

<i>Daily Trains</i>	<i>Trains in 1849 and in 1859</i>	
Between New York and Newark	22	70
Between New York and Elizabeth	14	32
Between New York and Rahway	12	24
Between New York and New Brunswick	10	18
Total-----	58	144

In addition to above way service, the New York-Philadelphia service was increased, during this ten year period, from 6 to 12 trains daily. By 1859, the total number of trips by the New Jersey Railroad's trains was 45,280; and the number of passengers carried, not including commuters or free passengers, totaled 2,110,993.

If nothing else, the above statistics attest to the rapid, and in some ways astonishing, growth of the New Jersey Railroad and Transportation Company. The railroad had won the confidence and the support of the people along its right-of-way; its equipment and rolling stock were

among the best in the country; financial problems had almost been forgotten and annual dividends of from eight to ten per cent were commonplace; and there was every prospect of continued improvement of business in the 1860's. Few people realized that the New Jersey Railroad had already entered the last decade of its independent existence, in 1857. Once again the Camden and Amboy Monopoly, which had recently lain dormant, at least as far as its relations with the New Jersey Company were concerned, began to harass the New Jersey's officers over the division of the New York-Philadelphia through fare receipts. One event led to another and suddenly the New Jersey Railroad found itself a victim of the Monopoly.

CHAPTER FIVE

The Last Years of the New Jersey Railroad

Despite the ominous but silent activities of the Joint Companies in the state capital at Trenton, the New Jersey Railroad's prosperity of the 1850's continued into the sixties. Business increased and a steadily enlarging stream of profits flowed into the treasury of the railroad. The stockholders and company officers were rejoicing and planning the future expansion of the road. Only a few of the older and far-sighted of the Directors could see the trouble on the horizon, and their warnings went unheeded as the road went confidently about its business.

In 1860, the New Jersey's tracks carried 2,501,124 passengers, and 98,007 tons of freight. The net receipts for the year were \$1,025,682.65—the first time in the company's history that the \$1,000,000 mark was surpassed. By 1862, the number of fares had increased to a new high of 2,394,625; during the same year, the freight carried also reached a new high of 100,215½ tons. This new, all-time high in traffic and freight also set a new record for net receipts, which rose to \$1,111,086.75. However, these new records looked rather insignificant when the 1865 report was announced. In the year 1865, the Railroad and Transportation Company carried the surprising total of 3,684,992 passengers and 230,280 tons of freight. The receipts for the same year naturally broke all previous highs—totaling \$1,875,981.87.

In order to maintain the ever increasing flow of traffic over its tracks, the New Jersey Railroad was constantly enlarging its rolling stock and physical facilities. In 1860 alone, three new locomotives were acquired, along with seven superior passenger cars from the famous car makers, Messrs. Cummings & Company, of Jersey City. By 1863, another six engines were purchased from the Rogers Locomotive and Machine Works. The years 1864 and 1865 saw the addition of a dozen new locomotives to the motive power of the road. Incidentally three of these engines were constructed in the company's machine shops at Jersey City. The last years saw the arrival of only three new engines, two of which were built in the company's shops. By the year 1867, the New Jersey Company had at its disposal thirty-six locomotives in operating condition, being fourteen more than they owned in 1860.

In order to maintain and service their new equipment, the New Jersey Railroad undertook an expansion of its existing repair facilities. The East Newark shops were reconstructed and equipped to build and refit the rolling stock. Unfortunately fire again struck the company, on February 19, 1864, and destroyed the East Newark car shop, resulting in a \$53,000 loss to the railroad. As a result of the fire, the contemplated company construction of both passenger and freight cars was frustrated.

In an effort to consolidate its shop facilities, the officers of the road decided not to rebuild the East Newark structure. Instead, plans were made to enlarge and renovate the Jersey City machine shops. Consequently a new car shop was erected adjacent to the machine shop, and additional property was purchased as a site for a new engine house. When the entire project was finally completed in 1865, the New Jersey Company had at its disposal the most up-to-date equipment available for the construction, repair and reconditioning of motive power and rolling stock. So extensive were the improvements to the Jersey City shops that it was deemed necessary to make an application to the Legislature for the authority to increase its capital stock. The Legislature passed a charter supplement, on March 17, 1865, permitting the railroad to raise its capital stock from five to six million dollars.

With new funds in the treasury, the Directors also purchased additional property in Jersey City, to rearrange the approaches to the Jersey City Depot and to the waterfront, in anticipation of a continued increase of passenger traffic, and to be "as well prepared to receive and dispatch freight to the South and West as any road whose terminus is at New York." This new approach required several minor alterations to the newly erected car and engine shops, but in no way impaired the efficiency of these two units of this vast project.

The importance of the Jersey City additions to the New Jersey Company's physical plant can not be overestimated. During the Civil War, it was almost impossible to obtain equipment from private manufacturers, and the company was forced to build all its new rolling stock and engines. Without the privately manufactured cars and locomotives, the railroad would have certainly found itself in a serious position during the war years. The government demands for troop transportation and transfer of war material placed the already heavily worked equipment of the New Jersey Railroad under an additional strain, which necessitated constant overhauling to the rolling stock. Fortunately the rapidly increasing repair facilities and shops of the company permitted the work to be done with a minimum of delay.

At the end of the War, the New Jersey Railroad and Transportation Company owned 249 cars of various types, including 84 passenger cars and 115 freight cars; and 37 locomotives. By 1867, the rolling stock of the road had been increased to 281 cars. The majority of the new cars were constructed in the company's Jersey City shops, which was another testimony as to their usefulness.

The right-of-way of the railroad was a never-ending scene of activity, during the 1860's. The increased traffic over the road required

constant repair work to the tracks. In the year 1863, over 25,000 ties and between 700 and 800 tons of iron rails were laid on top of newly ballasted roadbed. Two years later, another 28,000 ties and 1,000 tons of rails were replaced, after the constant pounding of wartime traffic had caused a rapid deterioration of the mainline tracks. In 1867, the first Bessemer steel rails were tested by the maintenance division, on the sharpest curves. So satisfactory were the experimental rails that an order for 300 tons was placed, to be laid in the Bergen Cut.

At the same time that the roadbed was undergoing constant repairs, the remainder of the right-of-way was the scene of many badly needed improvements, the most important being the construction of a new bridge over the Hackensack River. The old structure was too narrow to enable the newer and wider cars to safely pass over the river. In the winter of 1860, a new double draw swing viaduct was constructed parallel to the old bridge. The new structure was supported by improved trusses and turned on a pivot and circular railway, which enabled the bridge to be opened and closed in less than half the time previously required. The new draw was forty-one feet in width, allowing for the laying of a third set of rails if future traffic should demand expansion. In 1863, the draw over the Passaic River was also widened.

The year 1865 saw the final section of the New Jersey Railroad's mainline, from New Brunswick to the junction with the Camden and Amboy, at Dean's Pond, double tracked. Impressed by the virtues of the additional rails, both as to safety and expediency, the Directors made the necessary arrangements to lay an additional set of rails on the Millstone and New Brunswick Railroad.

Another phase of the New Jersey Company's construction program was the adaptation of various sections of its tracks to carry the trains of other railroads into the Jersey City terminal. By 1861, five railroads besides the New Jersey Road—the New York and Erie, the Morris and Essex, the Central of New Jersey, the Northern, and the Hackensack and New York Railroads were running their cars over the New Jersey's rails. With the exception of the Morris and Essex, which merged with the New Jersey Railroad at Newark, and the Central of New Jersey, whose tracks joined the New Jersey's at Elizabeth, the railroads all connected with the New Jersey Railroad west of Bergen Hill, and then used the route through the cut and the terminal facilities in Jersey City. In 1861, the average daily traffic across the Meadows and through Bergen Hill was 112 trains from the six roads, all of which were subject to operating rules of the New Jersey Company, to prevent any accidents from possible conflicting regulations of the various railroads.

To permit these various railroads with their different gauges to use their tracks, the New Jersey Railroad was constantly laying additional rails outside their four foot-ten inch track, inserting new frogs, and adapting switches. The roadbed of the New Jersey Railroad, from Elizabeth to Jersey City, was able to carry cars of three different gauges—four foot-ten inch, four foot-eleven-and-a-half inches, and six foot. The rents received by the New Jersey Company were substantial and

exceeded the costs of building and maintaining the various extra rails and equipment. However, by 1867, only the Erie and the Northern Railroads still leased the New Jersey's tracks, the other companies having prospered sufficiently to build their own tracks across the Meadows and erect terminals on the Hudson.

During the height of the combined rail traffic into the Jersey City depot, the New Jersey Company's ferries did a thriving business, and returned large profits to the Company. Up until 1862, the ferries all plied between Jersey City and Cortlandt Street, but on August 1, 1862, a new ferry slip at Desbrosses Street, near Canal Street, was opened to take care of the growing uptown traffic. The new ferry route quickly exceeded all expectations and added considerable revenue to the company treasury. By the end of 1865, the company had a fleet of eight ferries, with total passenger capacity of over 12,000, running on a twenty-four hour schedule.

In November, 1863, another "first" in the annals of American railroading occurred, when a train passed over an unbroken route from New York to Washington, D. C. The New Jersey Company's tracks carried the passengers bound for the nation's capital, from New York to the junction of the Camden and Amboy, at Dean's Pond, and from here, the Washington-bound trains proceeded over the Camden and Amboy's tracks to Trenton, then via the Philadelphia and Trenton Railroad to Philadelphia, and finally, over the Philadelphia, Wilmington and Baltimore and Baltimore & Ohio RRs to Washington. This new link in the nation's rapidly growing network of railroads proved to be an immediate success and two daily trains each way were scheduled by January, 1864.

In 1862, the New Jersey Railroad placed another improvement in service—the telegraph. Through an arrangement with the American Telegraph Company, wires were strung along the mainline, and keys were installed in every station. With this new service, the railroad announced that it was now able to provide "additional security against accidents and provide the essential service of giving notice of delays on our own or connecting roads; so that extra engines may be dispatched to keep up the regularity of trains . . ."

In spite of the expenditures of the railroad to modernize its rolling stock, equipment and property, in order that its passengers might obtain safe and efficient service, the Directors decided to go one step further and provide the public with *cheap* rail service. As early as June, 1860, the price of passenger fares began a downward trend, when the company announced that "the large and growing business between Newark and New York appears to entitle this portion of our travel to a discriminating reduction in fares, which will reduce the present charge about one-fourth . . ." On June 11th, the passengers between Newark and New York found the price of their tickets cut from 40 cents to 30 cents, during the heavily traveled morning and evening hours, with the regular 40 cent charge prevailing during the mid-day slump. However, the officials of the road promised that the fares would be reduced during the day, as soon as travel was sufficient.

Accompanying the reduction of the Newark-New York fare was a statement by the Board of Directors that the New Jersey Railroad was particularly interested in expanding its early policy of encouraging and enlarging local travel because, although "every portion of our road is now reaping the fruits of this early and persistent policy . . . a richer harvest is still to be realized from its careful cultivation . . . Our road is so situated as to be able to illustrate the advantages of reduced rates as business accumulates . . . and, as our capacities for the transportation of passengers can be extended almost without limit, the lowest minimum charge will be approached as these capacities are more and more employed." The success of this policy was attested to by earlier mentioned sharp increases in both passengers transported and receipts.

It was also in the first half of the 1860's that death took away the last of the original officers of the New Jersey Railroad and Transportation Company. On December 10, 1861, John P. Jackson, one of the early supporters of the New Jersey Railroad, first Secretary, Director and finally Vice-President, died at the early age of fifty-six, after twenty-nine years of service. Less than two years later, on October 14, 1863, the last of the initial Directors and the first and only President of the New Jersey Railroad, John S. Darcey, passed away. In paying tribute to their former leader, the Board of Directors stated that, "The New Jersey Railroad Company has sustained a great loss that can never be repaired, in the death of their head, the oldest officer then living, who, as legislator and original incorporator, was among the first promoters of the enterprise and continued in their service from the first organization; and who, by his prudence, integrity, moderation, influence and unremitting exertions for its benefit, has largely contributed to the success and the high character of the work."

Although the deaths of J. P. Jackson and J. S. Darcey have no tangible connection with the capitulation of the New Jersey Railroad to the Joint Companies, within five years after the Company was deprived of their leadership, their passing might almost be termed symbolic of the "death" of the New Jersey Railroad. However, the initial and perhaps the most consequential incidents in the battle with Joint Companies occurred within the life span of both Jackson and Darcey, but, up till their deaths, the New Jersey Company still had a chance to withstand the rapidly growing pressure that the monopoly interests were exerting. After their deaths, the balance began to definitely swing in favor of the Camden and Amboy interests and, by the end of 1866, the days of the New Jersey Railroad and Transportation Company were numbered.

It will be recalled that the New Jersey Railroad's charter contained a provision that authorized the railroad to construct a branch line, from near the Hackensack River bridge to any ferry on the Jersey shore, and if, by any chance, the New Jersey Company failed to build such a line, the ferry owner might then construct the branch. It was this seemingly harmless provision, which was inserted in the New Jersey Railroad Company's charter at the insistence of Stevens and his Hoboken Ferry Company, that led to the ultimate downfall of the New Jersey Railroad.

Also, another important factor in the suppression of the New Jersey Company was the dispute with the Camden and Amboy over the division of through fares, which was mentioned earlier, but had remained dormant since the agreement of 1843.

In the spring of 1859, the New Jersey Railroad asked the Camden and Amboy to consent to a revision of the schedule of through fares, to allow the New Jersey Company its share of the receipts. The relatively insignificant request of the New Jersey Road set off what might be termed a chain reaction in the Joint Companies and their numerous, closely connected interests.

The first of the series of reactions against the New Jersey officers' proposal was a harsh reprimand sent to J. P. Jackson by the Joint Company president, Richard Stockton, in which Stockton maintained that the New Jersey Railroad had made a "declaration of war" against the unwitting Joint Companies, who have "done everything for you and nothing against you. Our companies have not given provocation, although they have been informed of your desire to measure swords with us." Stockton then suggested a truce until the particulars could be studied by the Camden and Amboy's officers. The New Jersey Railroad hastened to reply that it had no intention to declare war on the Joint Companies and reiterated that it merely wanted to undertake amicable negotiations to increase its share of the New York-Philadelphia receipts which, under any circumstances, never exceeded sixty cents out of a two dollar fare, the remaining portion going to the Joint Companies.

From early spring until mid-December, 1859, the Camden and Amboy seemingly bided its time and delayed any proposals by the New Jersey Company to mutually discuss the apportionment of the through fares, steadfastly claiming that they needed more time to study the problem. The New Jersey Railroad's officials were forced to wait patiently for a Camden and Amboy offer to confer.

What actually went on in the Joint Companies headquarters, between March and December, 1859, will probably never be ascertained, but it now becomes obvious that the Stocktons and the Joint Companies joined hands with E. A. Stevens, to once and for all destroy the New Jersey Railroad and Transportation Company. The plan of action decided on by the two opponents of the New Jersey Railroad was to force through the Legislature the necessary permission to build a right-of-way, from the Camden and Amboy's tracks, south of New Brunswick, to Stevens' Hoboken Ferry.

The first overt act of the combined opposition to the New Jersey Company was a railroad bill, which was quietly introduced into the Legislature, on February 1, 1860. This new bill proposed the chartering of a road from New Brunswick to some point in Millburn, Orange or Clinton townships, in Essex County, all of which lie along the route of the Stevens-controlled Morris and Essex Railroad. At this point, the full intent of the route proposed by the Joint Companies and Stevens was not understood and the proposed railroad appeared to be so impractical that the bill was tabled. In order not to arouse the suspicions of the New Jersey Company, their opponents did not force the new bill and it remained pigeon-holed.

Several days after the New Brunswick, Millburn and Orange Railroad Bill was tabled, a bill entitled: "A Supplement to the act to incorporate the Hoboken Land and Improvement Company" was placed before the Legislature. On the first reading of this bill, which granted the Hoboken Land Company, a corporation organized by the Stevenses to take over their extensive real estate interests, the right to construct a railroad from Hoboken to Newark, the Joint Companies and the Stevenses cunningly nursed the bill past the New Jersey Railroad supporters and on to the floor of the Legislature, before their opponents knew the true contents of the measure, to which they naturally would have strenuously objected because it rivaled the New Jersey's line. Despite the denials of the Camden and Amboy that it was using its monopoly power in the Legislature to secure the passage of E. A. Stevens' Hoboken Land and Improvement Bill, it was evident that monopoly interests were solidly behind the bill, hoping that the supplement, if passed, would force the New Jersey Railroad to consolidate with the Camden and Amboy, and thereby abolish the necessity of building a new road from New Brunswick to the Hudson. In fact, the Camden and Amboy even approached the Directors of the New Jersey Company with proposals to either lease or buy the company outright, but all such schemes were promptly rejected by the New Jersey's Directors.

The proposed supplement to the Hoboken Land and Improvement Company's charter met far more opposition than was expected, but the monopoly interests once again managed to overcome the opposition, and the bill became a law by a vote of 36 to 22 in the House, and by a 14 to 7 margin in the Senate, on March 1, 1860. The news of this "bill of abominations," as it was sometimes called, was received with widespread indignation throughout the State. "The most prominent and influential newspapers, of all parties, united in terming it an outrage upon the good faith and the good name of the State, as an act intended to punish, if not ruin, an independent corporation, which had dared to refuse to pay homage to the great railroad power of the State . . ."

After securing the passage of the bill, which authorized the construction of the Hoboken and Newark Railroad, the Joint Companies once again tried to force the New Brunswick, Millburn, and Orange bill through the Legislature. However, by the time the proposed bill had reached the floor, near the end of the session, the opponents of the Camden and Amboy had finally mustered their forces and were determined to block the passage of the measure. For once their efforts were successful, because the monopoly interests had waited till too late in the Spring session to maneuver their scheme by both houses, and the New Jersey Company supporters began to demand that the Attorney-General investigate the Joint Companies' failure to comply with an 1854 bill, which required the Camden and Amboy to double track its mainline, to reduce the frequent accidents on its right-of-way. Since the Camden and Amboy had obviously made no effort to obey the 1854 law, its officers decided to drop the whole matter until the public's indignation over the Hoboken railroad had quieted down. By the beginning of the Spring session of

1861, the public uproar had died down sufficiently to permit the Joint Companies to secure a charter for the New Brunswick, Millburn and Orange Railroad, which was never constructed, but was constantly used as a threat to the New Jersey Company.

After the passage of the New Brunswick Railroad Bill, the New Jersey Railroad Company desperately tried to counteract the Camden and Amboy's satellite road by obtaining authorization from Trenton to construct "a direct line of independent railway from a suitable point on the Hudson river, opposite New York, to a like point on the Delaware River, opposite Philadelphia." Of course, the permission to construct such a through route was out of the question, while the Joint Companies controlled the Legislature. Every effort to secure passage of their proposals was promptly and effectively blocked by the Monopoly.

As a last resort, the New Jersey Railroad Company concentrated its efforts on blocking the extension of the Morris and Essex Railroad to Stevens' Hoboken Ferry. The New Jersey's officers, by virtue of their controlling interest in the Passaic and Hackensack Bridge Company, sought an injunction against the Hoboken and Newark Railroad to prevent the construction of any additional bridges over the two rivers. The New Jersey's legal staff was finally successful in obtaining a temporary injunction against the proposed extension, and then tried to get a bill through the Legislature, forbidding the erection of the projected structures of the Hoboken and Newark Company. The bill was quickly dismissed "on the grounds that a railroad viaduct is not such a bridge as comes within the exclusive rights of the Bridge Company." Inspired by the rejection of the New Jersey's bill, the Stevenses pushed their road across the swampy Meadows and through Bergen Hill, via a tunnel, an engineering feat which far surpassed the New Jersey Railroad's serpentine cut through the same ridge and, on November 18, 1862, the Newark *Advertiser* carried the announcement that "the new Railroad Line from this city to New York, via Hoboken, will commence regular trips tomorrow . . ." From this date hence, the trains of the Morris and Essex ceased to traverse the New Jersey's track from Newark to Jersey City. According to an agreement signed in October, 1863, the Morris and Essex purchased the branch tracks connecting the two at Newark, for the sum of \$200,000.

The completion of another railroad from Newark to the Hudson did not prevent the New Jersey Railroad from continuing its legal battle with the opposition. In 1861, the New Jersey Court of Chancery refused to uphold an injunction protecting the New Jersey's exclusive rights against the Hoboken Land and Improvement Company. Greatly upset by the refusal of the court to uphold the monopoly rights of the original Bridge Company charter, the Directors of the New Jersey Company removed "the case from the Court of Appeals of New Jersey to the Supreme Court of the United States, where all the points involved can be reviewed . . . and a final and conclusive decision be had as a guide to our Company, and all others claiming exclusive privileges." The last hopes of the New Jersey Railroad and Transportation Company's sup-

porters were smashed when the United States Supreme Court handed down a decision in favor of the Hoboken Company, holding "that a bridge constructed exclusively for railroad purposes was not one contemplated by or within the meaning of the act . . . which chartered the original bridge company."

The failure of the Supreme Court to uphold the monopoly provisions of the Bridge Company led to a surprising but very sensible change of attitude in their respective dealings with each other, on the part of both the New Jersey Railroad and Transportation Company and the Joint Companies. The Camden and Amboy, although it had emerged victorious from the legal fray, realized that its position was by no means invulnerable. Its monopoly privileges over the New York-Philadelphia route were to terminate in 1869, by limitation of its charter as amended back in 1854. With the end of its exclusive privileges certain, in the not-too-distant future, the Camden and Amboy had much to gain by a peaceful relationship with the New Jersey Railroad. Naturally the Directors of the New Jersey Company could foresee a very difficult future in store for their company as a result of the Court's decision and the recent chartering of the New Brunswick, Millburn and Orange Railroad Company, which meant that a Camden and Amboy controlled New York-Philadelphia railroad was now a definite threat to the New Jersey's share of the through revenue. As soon as the two companies saw how they could strengthen their respective positions, a rapid change in their relations with each other was immediately evidenced.

The first tangible benefits to come as a result of the improved understanding between the New Jersey Company and the Joint Companies was a revision of the through fares agreement, in 1862. Under a new schedule, the New Jersey's share of the New York-Philadelphia revenue was increased from 16 2/3% to 20%. Although it was still being denied its rightful share of the through fares, the Directors in their annual report to the stockholders, in June, 1863, admitted that "relations with the Camden and Amboy" had been placed "on a more harmonious basis, securing, by a greater unity of interests, unanimity in action, and enabling us jointly to give better accommodations than could be done by either independently."

The ultimate result of the improved relations between the New Jersey Railroad and the Joint Companies was a formal approach toward consolidation, in 1865. By 1865, the last of the anti-Camden and Amboy officers and directors had either resigned or died, leaving a younger and more farsighted group of men controlling the company. In the appointment of a committee to discuss the conditions of a merger with a similar group selected by the Joint Companies, it was not the intent or desire of the new leaders to destroy the hard-earned results of the many years of untiring labor and ceaseless effort of the company's early officers in building up the New Jersey road and maintaining its independence.

There was a general feeling among the new officers that it would not only be unwise to attempt to thwart the monopoly interests, but it would be a futile fight, with the odds against the New Jersey road.

On their side, the Joint Companies had the threat of legal authorization to build a rival road, plus control of the State Legislature, which, if necessary, could have been used to force the New Jersey road into a merger on unfavorable terms.

The New Jersey's committee to study the possibility of a consolidation was headed by Hamilton Fish, a member of the Board of Directors, while the Joint Companies' group was under the personal supervision of Ashbel Welch, the corporation's president. These two committees met for almost two years, in an attempt to iron out the various differences in an overall plan to effect the merger. This alone is proof that the new officers of the New Jersey Company did not intend to sell out their railroad at the first chance just to avoid the power of the Joint Companies. Despite the outward cordial appearance of the negotiations, it was often inferred that all was not as peaceable as it appeared to the public. However, the two parties finally came to an agreement, on January 28, 1867.

In a public announcement, the New Jersey's Directors stated that "after frequent and protracted meetings, an agreement was entered into, consolidating all the property and interests of the companies . . . By the consolidation, the property of this company is enhanced in value, by enabling its advantages as the terminus of the great Southern and West business to be developed . . . by obtaining through this company, a first avenue for their business pressing for a rapid communication to and from New York . . . The completion of the Connecting Road, at Philadelphia, places us in close alliance with the Pennsylvania Central Railroad, and with that company our road forms one of the four great trunk lines to the West, and may reasonably expect a large increase both in passengers and freight receipts . . . The Directors are confident as to the wisdom of the consolidation, and feel assured that all parties in interest will be fully satisfied with the results therefrom."

The final agreement between the Joint Companies and the New Jersey Railroad was subsequently approved by both the New Jersey Legislature and the stockholders of the respective companies. Under the terms of the 1867 merger, the New Jersey's capital stock was to be changed from \$50 to \$100 par value and increased from \$5,000,000 to \$6,250,000, the new shares to be offered to its stockholders for 60% of their par value. The stocks of the several companies were placed on an equal basis and the entire receipts were deemed joint receipts and were to be paid to all the stockholders of all the companies on an equal basis. In a like manner, all expenditures on the railroads were to be divided equally among the parties. The merger also provided that the Joint Companies should have 18 directors, including 2 selected by the Legislature, and the New Jersey Railroad was to have 9 members. The final settlement was declared retroactive to January 1, 1867, providing it was approved by the Legislature and two-thirds of the stockholders of each company.

It is here that the real story of the New Jersey Railroad and Transportation Company ends. The railroad, that for thirty-five years fought almost single-handed the powerful Monopoly, which not only controlled the railroads of New Jersey, but also effectively administered the political scene in New Jersey to aid its own ends, finally succumbed to a superior foe. However, it is to the credit of the New Jersey Company that capitulation was made on very favorable terms. As a member of the United Canal and Railroad Companies of New Jersey, the legal name of the consolidated companies, the New Jersey Railroad continued to prosper, but it was not the old New Jersey Railroad. Its policies were subject to the approval of the Joint Board and, since it had only a minority representation on the board, many of the former policies of the company were forgotten and new ideas were frequently over-ruled. Somehow the color and spirit of the early days of the New Jersey Railroad and Transportation Company were gone.

The last remnants of the heyday of the New Jersey Railroad became only memories after 1871, when the road became a link in the vast Pennsylvania Railroad System. Under the agreement signed with the Pennsylvania, the United Companies leased their properties and right-of-way to the Pennsylvania for 999 years. In return, the Pennsylvania agreed to pay a 10% dividend on the combined stocks of the United Companies, guarantee the bonded debt of these companies, and to make, in addition, an annual payment of \$10,000 to the lessors, in order to enable the United Companies to "keep up and maintain their corporate organization," which is in existence today and known as the United New Jersey Railroad and Canal Company.

Thus, by the lease of 1871, the New Jersey Railroad and Transportation Company became part of the Pennsylvania, and provided that system with a much sought entrance to New York, thereby permitting it to vie with the Vanderbilt and Gould railroads for the valuable New York-bound traffic.

After 1871, the old New Jersey Railroad, as such, so far lost its separate identity as to be almost forgotten today—a memory only of the earlier days of American railroading at its best.

Worth Reading

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Books and Pamphlets

The Assessment of Fees and Charges by Government Agencies, by Special Committee on Transportation Outlook and Policy, National Industrial Traffic League, Feb., 1953. 24 p. Free on request to Exec. Sec., National Industrial Traffic League, Sheraton Bldg., Washington 5, D. C.

British Steam Horses, by George Dow. 128 p. Illus., Diags. London, Eng., Phoenix House. \$2.50. " . . . primarily for those, chiefly in their teens, who . . . want to know more about the steam locomotive in all its aspects . . . "

"*Building a Railroad*" (1832-1952)—*The Seaboard Air Line, Its Beginnings and Its Contributions*, by John W. Smith, president. 32 p. The Newcomen address at the "1952 Virginia Dinner" of The Newcomen Society in North America, Norfolk, Va., Oct. 29, 1952. Introduction of Mr. Smith, by W. T. Faricy, president, Association of American Railroads, pp. 5-7.

Central Research Laboratory, Association of American Railroads . . . annual report 1952. 34 p. Illus. Published by the Laboratory, Technology Center, Chicago 16, Ill. " . . . This report highlights, for the benefit of those interested, the major research activities which the Association has underway, giving a brief statement of the need, the plan, and the progress of each phase or project."

Chicago Civil Defense Corps. Rail Transportation Division. Chicago Metropolitan Area. 32 mimeo. 1 charts, fold. maps. " . . . This is the Railroad Division plan for Civil Defense for the Metropolitan Area of Chicago, . . . " Issued by Chicago Union Station Co., 210 S. Canal St., Chicago 6, Illinois.

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Dynamic Braking on Diesel-electric Locomotives, by A. V. Johansen. 9 processed l. American Institute of Electrical Engineers, New York 18, N. Y. 60 cents.

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Taxation and Valuation Dept., Association of American Railroads, Washington 6, D. C. 87 p. Reprinted from Bulletin 503, American Railway Engineering Association, Sept.-Oct., 1952. \$1.00. Originally presented to A. R. E. A. by its Comm. 11—Records and Accounts, which commented: “. . . In the opinion of Committee 11, the monograph is an outstanding contribution to valuation literature and will be valuable not only to those engaged in valuation work, but also in rate cases, income and ad valorem taxes, and related activities, both as a reference book and as an authoritative statement of the procedures of the Interstate Commerce Commission and its Bureau of Valuation and the carriers in the initial inventory of railroad property and of its perpetuation.” (p. 3)

50 Años de Progreso Ferroviario—Ferrocarriles Consolidados de Cuba. Illustrated brochure published by Consolidated Railroads of Cuba, Grand Central Terminal Building, New York 17, N. Y., and Havana, Cuba.

Florida's Flagler, by Sidney Walter Martin. 280 p., Illus. Athens, Georgia, The University of Georgia Press. \$4.00. “. . . Although Floridians differ as to their opinion of Henry M. Flagler, none can deny that he was the greatest developer the state ever had . . .” (p. x) “. . . The last phase of Flagler's railroad construction in Florida was his most expensive and most daring, the overseas extension from Miami to Key West . . .” Ch. 12, *Flagler's Folly*, pp. 202.

Future Freights, by L. K. Sillico. Presented at Northwestern University, Feb. 19, 1953. 25 proc. p. New York 17, N. Y., The New York Air Brake Co., 230 Park Ave. “. . . To reiterate, the most efficient, accelerated, and economical service can perhaps be accorded the shipper by a co-ordinated rail-truck service wherein the trucks perform the collection and distribution of the over-all movement, with the railways handling the truck trailers on suitably designed flat cars for the line haul. That railway administrations are becoming sympathetic to this viewpoint augurs well for Future Freights.” (p. 25)

Grasse River R. R. Corporation, Conifer, New York. 4th annual report . . . 1952. Cover-title, 8 p., incl. illus. and cartoons. “Most of the Railroads in this Country grew from small beginnings, . . . The Grasse River is an outstanding exception to this general rule. It has never grown. Being a special purpose Railroad devoted to the task of hauling logs and lumber . . . what Grasse River has failed in prestige of mileage growth finds compensation in the mechanization of its equipment, maintenance of roadbed, and strict adherence to the policy of running trains on time . . .” (p. 3)

The Great Northern Today, by John M. Budd, president. 17 p. Map, p. 16. St. Paul 1, Minn., President's Office, Great Northern Ry. Free on request. “Mr. Robert S. Macfarlane, President of the Northern Pacific, has pointed out to you that, because of seasonal fluctuations of granger roads, complete dieselization is not justified at the present time. I am in agreement with him on this opinion, and do not anticipate that the Great Northern will purchase sufficient diesel power to carry us over seasonal peaks in the immediate future. There may be a solution to

seasonal fluctuations by operation of a pool of locomotives, from which individual lines can draw as required. There have been some recent discussions along this line. I feel it is a practical answer to a serious problem . . . " (p. 5) *Williston Basin Oil*, pp. 9-10. *Passenger Service*, pp. 10-14.

Iron Millionaire—Life of Charlemagne Tower, by Hal Bridges. 322 p. Illus. Philadelphia, Pa., University of Pennsylvania Press. \$4.75. Duluth & Iron Range Railroad construction, Ch. 13-16, pp. 172-223. " . . . 'First ore train ten cars two hundred and twenty tons brought . . . to Two Harbors July thirty first put into ore dock pockets Aug. first all in good order.' [1884]," pp. 222-223.

Illinois Central Railroad—Main Line of Mid-America. The Simplification of Its Debt Structure 1938-1952, by Edwin S. S. Sunderland. 23 p. Map. Privately printed, Dec. 31, 1952. Free on request to author, c/o Davis Polk Wardwell Sunderland & Kiendl, 15 Broad St., New York 5, N. Y.

The Katy Railroad and the Last Frontier, by V. V. Masterson. 312 p., Illus., Maps. Norman, Okla., University of Oklahoma Press. \$4.00. " . . . This is the story of the first railroad to enter the Indian Territory, a development that opened up the legendary Southwest to settlement and modern progress . . . "

List of NZR Steam Locomotives and their Allocation, December 1952, compiled by T. A. McGavin, honorary editor. 12 p. Supplement No. 4 to the New Zealand Railway Observer, 1952. Issued December 1952. List includes road numbers, types, classes, makers, maker's number, year built and allocation in 1952. Published by New Zealand Railway and Locomotive Society, 30, Plunket Ave., Petone, New Zealand.

Locomotive CC, S. N. C. F. 1500 V—4800 ch. 24 pp. Illus. and 2 folded diagrs. "Printed in France by the French National Railways," 610 Fifth Ave., New York 20, N. Y. CC 7001 and 7002 "des usines ALSTHOM" as tested on the French National Rys., pp. 3-5; CC 7101 to 7153 being delivered to them, p. 5. "La Locomotive CC ALSTHOM: Locomotive Europeene" p. 5. "Caracteristiques Générales" p. 6. "Partie Mécanique" pp. 7-16. "Partie Electrique" pp. 17-24.

New York and the Western Trade 1850-1910, by David M. Ellis. [18] p. Reprinted from New York History, Oct. 1952. Limited number of copies available from Prof. David M. Ellis, Hamilton College, 12 Observatory Circle, Clinton, New York.

The Ocean Port Story, by U. S. Defense Transport Administration, Washington 25, D. C. "A primer for defense mobilization" issued Feb. 1953. 31 proc. pp. Illus. Apply to DTA for copies.

On the Track of Some Good Teaching Aids? prepared by and free on request from School and College Service, Association of American Railroads, Transportation Bldg., Washington 6, D. C. 8 p. " . . . an effort to meet the needs of teachers, at all grade levels, for dependable supplementary aids in the teaching of transportation."

Overseas Railways 1952. Cover-title, 128, 216 p. Illus., Maps. London, England, The Railway Gazette, 33 Tothill St., Westminster, S. W. 1. 7 shillings 6 pence. Reports on railroads of Argentina, Aus-

tralia, Canada, Ceylon, Chile, Eire, East Africa, Gold Coast, India, Iraq, Malaya, New Zealand, Nigeria, Nyasaland, Pakistan, Peru, Rhodesia, South Africa, Sudan, and Uruguay.

Passenger Push, by L. K. Silcox. Presented before Graduate School of Business Administration, Harvard University, March 5, 1953. 32, vi 1, processed. Tables, diagrs. New York 17, N. Y., The New York Air Brake Co., 230 Park Avenue. ". . . New conditions have arisen requiring new measures . . . what is good now will probably be inadequate thirty years hence. Present-day planning must bear this fact in mind to assure that solutions developed for current problems can be adapted to future demands."

A Picture History of B & O Motive Power, by Lawrence W. Sagle. With Foreword by R. B. White, president, B & O. Dedicated to the memory of Charles B. Chaney. 82 p. Illus. New York 7, N. Y. Simmons-Boardman Publishing Corp. \$3.75.

Popular Mechanics' Picture History of American Transportation, edited by Edward L. Throm. 312 p. Illus., New York, Simon & Schuster. \$5.00. ". . . A panorama of American vehicles—from the stagecoach to the jet airplane . . ."

A Preliminary Investigation of the Possibilities of Expansion of Railroad Electrification in the United States, by Battelle Memorial Institute, Columbus, Ohio. [69] p. Diagrs. Processed. \$1.00. A report to Supervisory Committee of the Joint Committee on Railroad Electrification. Summaries in *Railway Age*, Sept. 15, 1952, pp. 82-84, and *Révue Générale des Chemins de Fer*, Jan. 1953, pp. 47-48. May be purchased in Pittsburgh, Pa. from Bituminous Coal Research, Inc., 2609 First Natl. Bank Bldg., and in New York City from Edison Electric Institute, 420 Lexington Ave.

Progress of Eighty Years 1852-1892—Japanese National Railways, Tokyo, Japan. [40] p., Illus. Free on request to Claude O. Bradshaw, American Representative, J. N. R., 1 Scott Circle, Washington 6, D. C.

Quadrille, by Noel Coward. A play, starring Alfred Lunt as an American railroader of the 1870s, wooing an English marchioness, played by Lynn Fontanne, who remarks "I am sure the railways of America owe a great deal to your blunt speech and your forceful character, Mr. Diensen, but kindly remember that I am not an American railway." Play printed "within a few days" of the "first night" at Phoenix Theatre, London, England, because it will stay there some time, and Americans and others interested in the railroad language in it, insisted on having copies to read, by William Heinemann Ltd. 5 shillings, 6 pence.

The Railroads of America, by Merle Armitage. 319 p. Illus. Reprints "Trains" by Thomas Wolfe, p. 11, and "America—Land of Railroads" by Robert S. Henry, p. 13. Includes illustrated articles on 46 large railroads in the United States and Canada and pictures "Modern Motive Power and Equipment of Twenty-Three . . ." more, pp. 309-316) as well as *Pullman* (pp. 317-318). Boston, Mass., Duell, Sloane and Pearce-Little, Brown, \$5.00.

The Railway Book—An Anthology, edited by Stuart Legg. 256 p. London, W. 1, England. Rupert Hart-Davis, \$1.90. “. . . a collection of corner-seat reading. As such, it is intended to appeal to everyone . . .” *Notes*, pp. 249-254. Index of Authors Quoted, pp. 255-256, includes: W. M. Acworth, C. F. Adams, “American Folk-Songs” [Casey Jones; Wreck of the 97.; Daid and Gone, etc.], Alexander and Nicholas, Czars of Russia; Charles Dickens, Emily Dickinson, M. C. Hsu, Rudyard Kipling, T. E. Lawrence, Wm. Morris, Cardinal Newman, Sir Walter Scott, Siberian Railway Guide, The Times, London, the Duke of Wellington, William Wordsworth, Queen Victoria, Emile Zola, and Robert Louis Stevenson.

Railway Signal Engineering. “. . . A challenging profession for electrical and mechanical engineers.” Illustrated brochure, free on request to General Railway Signal Co., P. O. Box 600, Rochester 2, New York.

The Resurrection of “Tweetsie,” by Shenandoah Central Railroad, Box 324, Harrisonburg, Virginia. 2 processed p. Free on request. “. . . permission is hereby granted for its use in any manner you may desire . . .” and a cheerful welcome is given to fans and historians who go to Harrisonburg, Va. to see the Shenandoah Central layout in what was a pasture on Dr. Paul S. Hill’s farm, where East Tennessee & Western North Carolina’s train “Tweetsie” now runs. See also *Train Named “Tweetsie” Revived to Run Again on its Narrow Track—Trio of Rail Fans Rescue Oldtimer from Junkman*, by Nancy Ford, in Wall Street Journal, January 23, 1953, p. 1.

A Review of Railway Operations in 1952, by J. H. Parmelee. 51 p. Reprinted by permission from Railway Age—Annual Review and Outlook Number, Jan. 12, 1953, with figures covering the year 1952, as Bureau of Railway Economics Special Series Bulletin No. 86, April 1953. Free on request to Association of American Railroads. Bureau of Railway Economics, Transportation Bldg., Washington 6, D. C.

Revolution on Rails—You Name It . . . RDC Does It, by The Budd Co., Philadelphia 32, Penna. Brochure illustrated in color, free on request.

The St. Lawrence Project—An Objective Analysis, by Walter J. Kelly, vice-president, Traffic Dept., Association of American Railroads, Transportation Bldg., Washington 6, D. C. Variouslly paged. Maps. Free on request to Mr. Kelly.

Self-Propelled Diesel Cars and Multiple-Unit Trains, by Stanley Berge, professor of transportation, Northwestern University School of Commerce, Chicago, Illinois. “A Review of Recent Developments in the United States and Overseas.” 80 pp. Illustrated. Tables, Diagrams, Graphs and Maps. \$1.00.

Some Classic Locomotives, by Hamilton Ellis. x, 175 p. Illus., partly in color. London, Eng., George Allen & Unwin Ltd. \$4.50. “. . . This is not a history of the steam locomotive. Nor is it a history of a phase of steam locomotion. But at a stage in its history that may be more or less critical, it seems proper that an intimate record should be made of certain types and classes . . . many of which have com-

bined to produce important landmarks . . . These essays are confined to British locomotives except where, as in the case of the Cramptons, a British type was extensively exported, or where, as with the Atlantic and the 4-6-0 locomotive, British railways adopted a characteristic design from abroad . . ." (pp. vi, vii).

Sound Transportation for the National Welfare—Submission of the Board of Directors, Transportation Association of America, to the Congress of the United States, February 1953. 225 p. Chicago, Ill., Transportation Association of America. \$6.00. Includes Report of the Policy Administration Board and Panels of the Cooperative Project on National Transportation Policy.

The Steam Locomotive in America—Its Development in the Twentieth Century, by Alfred W. Bruce. xii, 443 p. Illus., Diags. New York, W. W. Barton & Co. \$7.50. "The Great age of the steam locomotive is past . . ." (Introduction, p. 3). "Development of Basic Elements" Ch. 6, pp. 121-275. "Progressive Development of Individual Types . . ." Ch. 7, pp. 276-351, contains "Photograph Section." "The Competitors of the Steam Locomotive" Ch. 10, pp. 398-411. "The Future Design of the Steam Locomotive" Ch. 11, p. 412-418.

The Story of The Assam Railways and Trading Company Limited, 1881-1951. 64 p. Illus., Maps. Printed for the Company by Harley Publishing Co., Ltd. Distributed by the Director with the Company's 71st Annual Report for the year ended 31st March 1952, from its headquarters 154-156 Fenchurch St., London, E. C. 3, England. *Dibru-Sadiya Railway*, Ch. III, and in Ch. X—*War*, which mentions: ". . . Soon after the mass movement of evacuees from Burma had ended, U. S. Army road-builders moved in, and demands on the Company's railway became heavier than ever . . . The traffic over the Company's railway was tremendous and diverse. It included . . . (p. 24). In 1944 U. S. Military Railway Units took over the operational control of the line, bringing with them a large number of locomotives and thousands of wagons from the U. S. A. At all important stations, Americans and Indians worked side by side as examiners, pointsmen, shunters and so on . . . (p. 55)."

Ties That Bind—A Selection of the Finest Stories about Railroads and Railroad Personalities. Washington 5, D. C., Federation for Railway Progress, 1430 K. St., N. W. \$1.00. Contents: *New Railroads for All*, by Robert R. Young. *A Link through the Jungle*, "Assam Rail Link" in India, by Joseph R. Slevin. Built 1949-1950; *The Broiler Special* on the Belfast & Moosehead Lake RR in Maine, by Fred B. Barton; ". . . *'That Rascal Gould*," by McClure Meredith Howland; *The First Circus Train*, by George W. Grupp. *The Golden Spike "D-O-N-E"*, by George W. Grupp; *Henry Flagler: Empire Builder*, by Gordon Huffines; *Fish Train*, by John T. Cunningham. ". . . This year marks the twentieth anniversary of the Long Island's Fishermen's Special . . ."; *Build 'em up—Blow 'em up—Army Transportation Corps in Korea*, by Sidney A. Levy; *The Atomic Line—the Northern Alberta*, by Richard L. Neuberger. Unpaged, so contents is listed in order of printing in the book. Maps, Cartoons, Illustrations.

Where Ships, Canton's Electric Cranes, Conveyor Belt and Diesels Meet. An illustrated brochure, free on request to Canton Railroad Company, 300 Water Street, Baltimore 2, Maryland.

Why Don't People Ride Trains? by Anthony F. Arpaia, member, Interstate Commerce Commission. His talk to 7th Rail Transportation Institute, American University, Washington, D. C., March 27, 1953, 13 1. processed. Summaries in *Railway Age*, April 6, 1953, pp. 11-12, and *Traffic World*, April 4, 1953, p. 25.

Articles in Periodicals

Alaska Railroad Winter Operating Conditions, by Col. J. P. Johnson, general manager. The *Railroad Evangelist*, April 1953, pp. 15-16. First of a series.

Annual Review and Outlook Number, RAILWAY AGE, January 12, 1953. 272 p. Illus., Charts, Tables. "A Review of Railway Operations in 1952," by J. H. Parmelee, pp. 144-164. Reprint noted in Books and Pamphlets section. "The horizon looks brighter . . . as '52 passes"—photographs with captions, pp. 164-177. "Calendar of Labor and Wage Events—1952" by John S. Gallagher, Jr., p. 210. "Motive Power Orders in 1952," by H. C. Wilcox and Fred C. Miles, pp. 226-232, mentions "Decline of Steam" and ". . . One of the really significant events in the motive power field in 1952 was the order for 15 additional gas-turbine locomotives for service on the Union Pacific. This may be a slight indication that this newest type of motive power is passing from the experimental to the practical stage." Also reviews of engineering, maintenance, and other phases of railroading, including financial. "Canadian Railways Battle Higher Costs" pp. 233-236. "Better Equipped Mexican Roads Get More Traffic; Change Deficit to Net" by Alonzo Hernandez Lozano, pp. 237-239.

Big Southern Pacific Brawled Its Way Up with the West, Aims at Hitting Jackpot Again as New Customers Flock In—Improvement-Conscious Road Spent Over \$500 Million on Build-Up Since War, by R. E. Thompson, staff correspondent, San Francisco. *Wall Street Journal*, March 16, 1953, p. 10. Map.

Broad Street Station Passes, by C. H. Vivian. *Compressed Air Magazine*, April 1953, pp. 104-110. Illus. see also *Old Broad's Gone*. The *Pennsy*, April 1953, pp. 20-21. ". . . Eleven months required to demolish the stoutly-built structure; . . ."

Business Men in the News—Another Collision on the New Haven?—White of the New York Central. *Fortune*, March 1953, pp. 55-60 and 127-128, 158. Photos. Port. in color of Mr. White.

CNR to Display Mobile Museum—Three old locomotives and six cars will house hundreds of exhibits pertinent to Canadian railroading from 1836. Illus. ". . . said to be the only mobile museum in the world . . . The train, which will be open for inspection at Montreal from April 24 to 29, will make its first official run on May 16 from Toronto to Aurora, commemorating the 100th anniversary of operation of the first steam locomotive in Ontario. . . . July . . . eastern Quebec

. . . the centennial of the St. Lawrence & Atlantic . . . from August 28 to September 12 . . . at the CNR Exhibition in Toronto. Later in September it will move from Toronto to Niagara Falls and Sarnia over the lines of the Great Western, which also celebrates its 100th anniversary in 1953 . . . will be used similarly for other centennials and like events. While on exhibition it will be staffed by retired railroaders dressed in the style of costume worn by crews one hundred years ago . . . " See also "Interest Value" in The Railway Gazette, London, Eng., March 20, 1953, p. 316, regarding one of the exhibits received under circumstances—a Nova Scotia Railway ticket.

Crossing—"Stop-Look-Listen," by Philip Booth. The New Yorker, April 4, 1953. A gay poem about counting cars by owners' names in "a fast-freight dream."

Developments in Soviet Russia. The Railway Gazette, March 13, 1953, p. 301. New lines—Chardzhon-Makat across Kara Kum Desert in Turkestan South Siberian, each about 800 miles long. See also "U. S. S. R.—Railway Shortcomings Criticized." The Railway Gazette, March 27, 1953, p. 366.

Drang Nach Norden; The United States and the Riel Rebellion (1869-1870), by Donald F. Warner. The Mississippi Valley Historical Review, March 1953, pp. 693-712. ". . . So the movement failed for lack of support. Despite this, it has importance for the historian . . . it shows a facet of the activities of the railroad builders [in the west]."

A Fast Way to Lay New Track—Developed—Developed on the QNS&L [Quebec, North Shore & Labrador]. Railway Age, April 6, 1953, pp. 72-74. Illus. ". . . Easily applied gauge roads and demountable rail-rack cars facilitate building 360 miles of line to reach iron ore deposits . . . One unit of the day forces places the crossties to proper alinement and spacing on the subgrade, and is followed by the rail-laying gang. The ties are creosoted hardwood, most of which are shipped in from Texas . . ."

Freight Car Report—Roller (Anti-Hot Box) Bearing Is Winning Some More Converts—New Iron Ore Hauling Road [QNS&L] Will Have Nearly All of Its Cars So Equipped—Can the Trend Spread Far? by William Moore, staff reporter, New York. The Wall Street Journal, April 18, 1953, pp. 1, 8.

High-Level Railroad Cooperation plus OPERATIONS RESEARCH METHODS . . . Equal More Efficient Railroadng—How the Westinghouse Air Brake Company plans to apply the new science of Operations Research to develop better procedures and equipment for railroads. Railway Age, April 20, 1953, pp. 71-76. Illus. "Through its recently acquired subsidiary, Melpar, Inc., situated at Alexandria, Va., . . . " "Distributing Empty Cars" pp. 73-74. "Efficient Yard Capacity" pp. 75-76.

Indian Railways—1853-1953. The Railway Gazette, March 30, 1953, pp. 327-344. Special section, containing: . . . "Background to the new phase of development initiated by Partition and the later regrouping of the systems" by F. C. Badhwar, chairman, Indian Railway Board, pp. 327-335; "Indian Locomotive Development and Practice—The con-

tribution of British manufacturers throughout a century" pp. 336-338; "Rolling Stock Design in India—Transition in recent years to construction of lightweight stock" pp. 339-340; "Trans-Indian Expresses" (photographs), p. 341; "Large Bridges in the Indian Sub-Continent" pp. 342-343 (photographs); trains on 2-ft. 6-in. gauge Kalka Simla, and 2-ft. Darjeeling-Himalayan, p. 344 (photographs). Editorial comments: "Reasons for Building Many Indian Railways" "The Kangra Valley Railway"; "State Railway Administration in British India" and "Safety on Indian Railways" p. 310; "British Indian Railway Achievements" pp. 311-313. Illustrations and Maps.

New Diesel Engines are Stalled by Rail Union, by Ray Vicker, staff reporter, Guatemala City. On International Railways of Central America. ". . . Six diesel engines purchased by the line haven't hauled a pound of freight since Sept. 15, 1951. Reason: The Red-Dominated Syndicate for Betterment of Rail Workers, the rail workers' union, claims the diesels are job-killers since they handle freight more efficiently than steam locomotives. So no union man will ride on a train with the diesels." Box, p. 1, in his "American Redland? Communist Minority in Guatemala Works Way Into Near Control" . . . The Wall Street Journal, April 10, 1953.

New Railway in Colombia—Opening up a river-rail route to the interior. The Railway Gazette, March 27, 1953, p. 367. Map. "On January 17 the President of Colombia laid the first rail of the 236-mile Magdalena Railway, authorized in November last. It will run from the existing railhead of La Dorada northwards to Puerto Berrio and Capuleo following the Magdalena River . . ." See also Advertisement, p. 10 E, in The New York Times, Sunday, Feb. 1, 1953, "The Republic of Colombia's solution to her Transportation Problem" Map.

The New Shelburne Museum [Vermont] of Americana Founded by Mrs. J. Watson Webb, by Allene Talmey. Illus., partly in color. Text includes career sketch of Dr. William Seward Webb, president of the St. Lawrence & Adirondack Ry. Co., and Wagner Palace Car Co., and of his "cruise" around the United States and Canada in 1889 in his private train, p. 227.

The Opposition of American Businessmen to Social Control during the "Gilded Age," by Chester McArthur Destler. ". . . Did the railroadmen or their spokesmen invoke the same doctrines that the Carnegie and Rockefeller groups found so useful? . . . p. 699.

"*Piggy Backs*"—*Good or Bad—Observations on trailer-on-flat-car service, including suggested basis for charges*, by John S. Gallagher, Jr. Illus., and diagram. Railway Age, April 20, 1953, pp. 80-83. Abstract from L. K. Silcox's "Future Freights" in box, p. 81. "What About 'Box Car' Freight?" in box, p. 82. "A 24-hour count of semi-trailer truck units at three selected highway locations near Chicago"—table, p. 83.

Positive Approach Builds Passenger Business . . . the New Haven is striving to win business with more trains, new equipment, good will. I-IV. Modern Railroads, February 1953, pp. 43-63. Illus. II—

Promotes Tours and Excursions. III. Courtesy Brings Good Will. IV. Scraps Outmoded Dining Car Concepts.

Progress in Railway Mechanical Engineering 1951-1952, Report of Committee RR-6, T. F. Perkinson, chmn., American Society of Mechanical Engineers. *Mechanical Engineering*, April 1953, pp. 291-306. Illus. Bibliography, p. 306.

Railway to the Sky, by Geraldine Reese. The Grace Log, March-April 1953, pp. 8-11. Illustrated. The Central Railway of Peru.

Rubber Conveyor Beltroad. *Mechanical Engineering*, March 1953, pp. 232-233. Map, Illus. ". . . A 4½-mile rubber conveyor beltroad to transport iron ore and limestone from harbor to industrial processors in the Cuyahoga Valley . . ."

The Standardization of Railway Gauges in Australia, by W. D. Chapman. International Railway Congress Association Monthly Bulletin, February 1953, pp. 113-120.

Trinity in Dallas . . . *Wherein three railroads [Rock Island, the Texas & Pacific and the Cotton Belt] join hands with a private realty corporation [Industrial Properties Corporation, John M. Stemmons, president] to the benefit of all*. *Railway Freight Traffic*, April 1953, pp. 25-26. Map, Ports., Illus. ". . . But what has happened in seven short years on 500 acres is just a prologue . . ."

The West's Wildest Hunting, by Herbert Asbury. *Argosy*, January 1953, pp. 50-51, 74-75. ". . . When dude ranchers of the Old West shot buffalo from special excursion trains, they blasted everything in sight, including train windows and fellow passengers . . ."

The Winged Ones, by Ogden Nash. The New Yorker, December 20, 1952, p. 32. Poem about ". . . the only trouble with trains: When it fogs . . . you get people from planes." Reprinted in ACF Wheels, March-April 1953, pp. 17-20, and in Modern Railroads, March 1953, p. 58, the latter with a note: "If you want this poem—beautifully reproduced in larger type—suitably framed for your office or reception room—write the Editor [Frank Richter, 201 N. Wells St., Chicago 6, Illinois.]"

New Books

THE STEAM LOCOMOTIVE IN AMERICA, ITS DEVELOPMENT IN THE TWENTIETH CENTURY, by Alfred W. Bruce. 443 pages, 9¼x6, illustrated. Published by W. W. Norton & Co., Inc., 101 Fifth Ave., New York (3), N. Y. Price \$7.50.

With the gradual displacement of the steam locomotive by the diesel-electric, it is only fitting that a book should be published covering its development in the past fifty years and, this book does just that. The author has not been unmindful of the past and the first 74 pages are devoted to the locomotive industry and the locomotive. His method of presenting each builder with the leading personnel and the table listing these builders, the period of their activity and the approximate number of locomotives built is a distinctly new feature.

The balance of the book is given to the general development of the steam locomotive from 1901 to 1950 and here will be found a wealth of material covering all of the features that have been used during this period. Sixty-two pages are given to a discussion of all of the different types, their origin, size, use and the approximate number constructed. There are 168 illustrations and various diagrams and the book closes with a table giving the total production of steam locomotives in the United States from 1831-1950. It gives the production for those years, the number of locomotives exported and the allocation of the domestic locomotives for each type built in this country.

The author of this book has had forty-five years of experience in building locomotives. He was assistant vice-president in charge of engineering with the American Locomotive Co. He is amply qualified to handle this subject and he has handled it with fairness and honesty to all individuals and companies that were concerned with this development. The book is technical enough to be of interest but not too much to prove tiresome. It is a book that will grow in interest and value in the succeeding years. Other authors will doubtlessly turn to this same subject but it will be difficult to match this work. Thus, if you are interested in our steam locomotives during the past fifty years, the different types, their builders, you will surely want to own a copy of this book and you will never regret having a copy in your library.

THE RAILROADS OF THE CONFEDERACY, by Robert C. Black, III, 360 pages, 9¼x6, illustrated. Published by The University of North Carolina Press, Chapel Hill, North Carolina, price \$6.00.

To those who are familiar with the various congressional documents and reports, together with the various railroad reports during the time of this conflict, they are fairly familiar with the havoc that was done to these southern carriers. With the development of the railroad, in time of war it became an instrument of battle. No one can ever accuse the south of lacking in brilliant military leaders on the field of battle but, the truth remains that the south was an agricultural section, its manufacturing sources were limited, especially in the matter of iron and the union blockade shut off all sources of outside supply. The south was

thoroughly imbued in the matter of states rights and, instead of working together as a union, they worked as individuals. Not until the south was mortally wounded did President Davis dare use the authority given him of seizing railroad property and using it for military purposes. Furthermore, these southern roads were, in the main, built to serve local communities but, when they were linked up as individuals, in an attempt to serve a nation under military necessity, the routes were circuitous and slow and this can be fatal to military movements. That the railroads did as well as they did, cut off from all supplies, is a tribute to southern ingenuity.

No one can read this book and not be impressed with the vast amount of research that was done by the author. His bibliography of fifty pages is a veritable mine of information on this subject and, he has taken these dry reports, these military records and made a fascinating story. Maps play an important part in a work of this kind. Attached to the rear cover is a large map of all of the southern railroads as of June 1, 1861, showing the individual carriers with the track gauge. Smaller maps show also the carriers identified with the different campaigns and these add so much to the value of the book. There are some illustrations but subjects relating to southern scenes are not common and the author has done well to collect the dozen or more that he has included.

The author deserves much commendation for his efforts. It is a book that one can pick up and read from time to time and that is the test of any good book. The story has been told fairly and without harshness. Praise has been meted out where deserved, both to individual and carrier and, in the light of after years, honest criticism has been evoked where it was deserved. But, to us, in the year of 1953, it carries a warning, that we too need strong railroads, not only should the occasion arise in time of military necessity but in time of peace. You can't help but enjoy this book.

THE NORTHERN RAILROADS IN THE CIVIL WAR, by Thomas Weber, 318 pages, 5¼x8. Published by King's Crown Press, Columbia University, New York, N. Y. Price \$4.00.

This book covers the northern railroads during the civil war years in a similar fashion to "The Railroads of the Confederacy." These railroads, like those of the southern states, faced tremendous increases in both passenger and freight traffic and altho' their sources of supply were greater than that of the south, these same sources were limited because of military necessity. But the fact that the great majority of our northern roads could function without interruption, for the carrying of troops and supplies, was a contributing element in success for the north.

The author has devoted three chapters to the northern railroads at the outbreak of the civil war and three more chapters upon the effect of the war on these same railroads. One chapter is devoted to the need for regulatory legislation and another is given over to the controversy on that single artery between New York and Washington. The re-

mainder of the work is devoted to the United States Military Railroad in the east and in the west and the book closes with a chapter covering the contributions that the railroads made to the science of war.

In the space allotted him, the author has placed between these two covers many salient and interesting facts. Unfortunately, the work contains no maps and, to this reviewer, that too much space has been granted to the roads not in the war theatre and not enough to those that were. While it is true that the railroads running east and west from Chicago were affected in many ways, they were not affected as directly as the Baltimore & Ohio R. R., whose main line suffered constantly from southern raids and depredations nor did these western roads have to carry the heavy traffic burden as did those making up the New York-Washington route. However, the author has made a valuable contribution to a four year period of railroad history and he should be commended for his efforts.

HEAR THE TRAIN BLOW, by Lucius Beebe and Charles Clegg, 416 pages, 11x8, illustrated. Published by E. P. Dutton & Co., 300 Fourth Ave., New York (10), N. Y. Price \$12.75.

In about 900 illustrations and a moderate amount of text, the authors of this book have, as the subtitle indicates, created—"A Pictorial Epic of America in the Railroad Age." In the eighty years from the first steam locomotive to the coming automotive era, the flanged wheel pretty much dominated the scene. Mention is made of the canal and toll road era which the railroads doomed and then it covers the period of 19th century railroading with the early equipment, to our twentieth century knowledge, the building fever that swept the nation, the civil war period, the joining of the rails at Promontory and so on, to the present, with much in between. I think it would be safe to state that the book is a series of essays, each of which indicates a trend that has been indicative of railroading or popular action thereto, each having contributed in some manner to our present-day railroad. The book is a combined mine and museum of railroadiana and the authors have succeeded in blending the straight historical narrative with some of their own observations.

Since it is the illustrations that are the greatest asset to this work, this reviewer will take the opportunity of pointing out some errors in the matter of the actual photographs. Whether these errors were caused in part by being improperly labelled at the source, he has no way of knowing. On page 10, the illustration supposed to represent a New York, West Shore & Buffalo R. R. train is a New York Central. The West Shore never had any locomotives like that and the picture was probably made thirty years before the West Shore was built. The illustrations on pages 40 and 41, probably this reviewer, with one or two others has searched faithfully for the past forty years for a photograph of the "Fall River Line Steamboat Express" and so far, because of the time of departure and arrival, it is doubtful if any exist. There is a possibility that the train to which the "Randolph" is attached is this train—but, there is nothing to prove that it is and certainly, the illustration of New York, New Haven & Hartford No. 21, taken by that

famous photographer Bishop, just outside of New Haven, with the long New Haven mail car, is far removed from the "Fall River Line Express." On page 45, this reproduction made originally from a daguerreotype located by one of our members at Orleans, Mass., in reality shows the first train leaving that little Cape Cod community on the Cape Cod R. R., drawn by the engine "Nauset," originally named "Barnstable." This illustration has appeared several times in western railroad material, especially that of the Chicago, Milwaukee, St. Paul & Pacific, and one is glad to see it in its proper surroundings, for a change. The lower illustration on page 44, shows the Old Colony locomotive "Rockland" on the crossing at Hanover, Mass. On page 48, the Mason records and the tender of the locomotive confirm that the "Highland Light" was built for the Cape Cod Central R. R. On the next page, the authors overlooked the fact that the famous "White Train" between Boston and New York carried two coaches and was not and never was an all-Pullman train. Possibly the B & O borrowed that locomotive for the purpose as stated by the authors on page 97 but, that is definitely a Pennsylvania R. R. locomotive and, in the opinion of this reviewer, the scene is also laid on that road. And lastly, on page 311, the Boston & Worcester R. R. does not enter the city of Pawtucket, Rhode Island. The scene is a reproduction from a well known daguerreotype showing a wreck at Boston switch, near Pawtucket, R. I., of a Boston & Providence train and one from the Providence & Worcester R. R. Whether these errors were caused from the source of the material or by the authors, I am unable to state but these prints are commonly known amongst the older New England collectors.

But the book tells of how this nation was explored by the railroads, how it was civilized by the Pullman Palace car and enriched by what was carried between the engine tender and caboose. The contents are so diverse that each opening brings forth new material and the authors may take justifiable pride in their efforts on railroad romance.

THE TRAIN THAT NEVER CAME BACK AND OTHER RAILROAD STORIES, by Freeman H. Hubbard, 127 pages, 8½x5½, illustrated by Kurt Wiese. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York (36), N. Y. Price \$2.25.

This little volume is a collection of some of the better known stories and these stories have not suffered in their retelling in the hands of the author. The train that never came back is the story of the tragic Hinckley fire and then follows a story of John Henry, a race for the Royal Gorge between a Santa Fe civil engineer and a D. & R. G. construction gang; the phantom brakeman—a story of the Santa Fe in the Raton pass; Kate Shelley and her brave act in saving a C & N W passenger train; the famous Casey Jones and finally, the brave act of Joseph Oman, Southern Pacific towerman in saving a runaway train. The stories are told in an interesting fashion and the illustrations help in the telling. And, whether you are six or sixty, you can't but admire the grit and courage of Herman Keeney at the time of the flood in Paducah, Ky. These stories are worth reading and knowing and, passing on to the younger generation.

THE NEW DICTIONARY OF AMERICAN HISTORY, by Michael Martin and Leonard Gleber. 695 pages, 8 $\frac{7}{8}$ x5 $\frac{3}{4}$. Published by the Philosophical Library, 15 East 40th St., New York, N. Y. Price \$10.00.

This volume provides a ready reference source of American History. In this one volume, the authors have successfully consolidated more than 4000 articles arranged alphabetically, that cover the material of American history, from the early colonial period to mid-1952. Approximately 1300 biographies are included and the book also covers the significant developments in the fields of Economics, Financing, banking, labor relations, social security, literature, science, commerce and the arts in addition to the usual political and military events. It seems to this reviewer that this comprehensive and scholarly work which is almost encyclopedic in its scope, should find a place in the library of every teacher, scholar and layman.

A PICTURE HISTORY OF B & O MOTIVE POWER, by Lawrence W. Sagle. 82 pages. 10 $\frac{3}{4}$ x8 $\frac{3}{8}$, illustrated. Published by Simmons-Boardman Publishing Co., New York, N. Y. Price \$3.75.

To those of us that enjoyed the author's articles on this subject as they appeared in the Baltimore & Ohio Employees' Magazine, it is a satisfaction to have them all between two covers. There are many to whom this book may not have any appeal but, it must be remembered that a history of the B & O motive power is a history of the development of the motive power in this country. It would be difficult to name a type of locomotive that this road has not used and they have had many not found on any or many of our railroads. Experimental locomotives have been built and tried, classes of locomotives have been rebuilt either for the same or other service—the management of this railroad has shown a willingness to experiment and an alertness in rebuilding not found on many of our railroads.

The author is eminently qualified to handle the subject and he has perhaps wisely let the illustrations tell a great deal of the story. The text is clear cut and factual and not weighted with mechanical details and specifications. The text is divided into the three different kinds of service for the steam locomotives with chapters for the electric and diesel electric locomotives. No attempt has been made to include the locomotives that came from other roads but, the Mallets received from the B. R. & P., those purchased from the S. A. L. and the 4-8-2's from the B & M are included. The author is to be congratulated in presenting such a concise history covering 125 years of the steam locomotive and it is a book that surely should interest the majority of our membership.

MINUTES OF THE ANNUAL MEETING OF THE RAILWAY & LOCOMOTIVE HISTORICAL SOCIETY, INC.

The Annual Meeting of the Railway & Locomotive Historical Society, Inc., was held at the Hotel Bellevue, Boston, Mass., at 2:30 P. M. on Sunday, May 3rd, 1953 with the following members present: Messrs. Becker, Cole, Fisher, Forsyth, Fogg, Gaynor, Graves, Greene, Harrison, Parker, Schmid, Shepard, Twomey, Whitaker and Yungmeyer.

President Fisher was Chairman of the Meeting.

The Secretary read the report of the last Annual Meeting, which was accepted.

Reports of the President and Treasurer were accepted as published. It was voted to continue the activities of the Chapter By-Laws Committee for another year.

A motion, commending our Financial Secretary, Howard F. Greene, on his fine work in behalf of the Society, was unanimously voted.

Mr. Fisher presented to the Meeting the question of whether the Society should take a part in a possible tribute to William Mason on the 100th anniversary of the construction of the first locomotive at the Mason Works. Upon motion, unanimously adopted, Mr. Greene was appointed a Committee of one to study the matter and take appropriate action.

Mr. Merrill, representing the Nominating Committee, offered the following names for the office of Director, to serve until the Annual Meeting in 1956: Mr. George P. Becker: Mr. H. L. Harrison, Mr. John W. Merrill, Mr. R. E. M. Whitaker.

Motion was made, and unanimously voted that the Secretary cast one ballot for the above named and they were declared elected.

The meeting was then adjourned.

A true record.

ATTEST: Charles E. Fisher, President

Harold D. Forsyth, Secretary

At a Meeting of the Directors, held immediately following the Annual Meeting of the Members, on May 3rd, 1953, the following officers were elected:

PRESIDENT	Charles E. Fisher
VICE-PRESIDENT	D. W. Yungmeyer
TREASURER	George P. Becker
SECRETARY	Harold D. Forsyth
FINANCIAL SECRETARY	Howard F. Greene

It was voted that the Membership fees for the coming year, remain as at present.

In Memory of

A. W. AINSWORTH

Annual Member

890 Bonnie Brae Blvd., Denver, Colo.

Who Died on February 21, 1952

C. B. BURR

Annual Member

Academy Hill Road, Derby, Connecticut

Who Died on December 16, 1952

ALEXANDER F. DALLAS

Annual Member

4 Sheridan Road, Livingston, N. J.

Who Died on September 14, 1952

FREDERIC W. GRIGG

Annual Member

Newton, Massachusetts

Who Died on September 16, 1952

CHARLES R. KUHNLE

Annual Member

327 Dunkirk Road, Baltimore, Md.

Who Died on March 15, 1952

FRED MCWILLIAMS

Annual Member

74 Broad St., Montgomery, Pa.

Who Died on May 18, 1952

CARLTON MEYER

Annual Member

420 Lexington Ave., New York, N. Y.

Who Died on February 16, 1953

THOMAS E. OWEN

Annual Member

Louisville, Kentucky

Who Died on January 6, 1953

STANLEY W. TODD

Annual Member

25 Wanamassa Pt. Road, Wanamassa, N. J.

Who Died on November 9, 1952

